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POCKET ENCYCLOPEDIA

OR A

DICTIONARY

OF

ARTS, SCIENCES,

AND

POLITE LITERATURE:

COMPILED FROM THE BEST AUTHORITIES

BY

EDWARD AUGUSTUS KENDAL.

*Embellished with Copper Plates designed and engraved by
EMINENT ARTISTS.*

SECOND EDITION. ~~Corrected and much enlarged.~~

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PREFACE

TO THE SECOND EDITION.

IN presenting the public with a new impression of the **POCKET ENCYCLOPEDIA**, the editor, into whose hands it has now fallen, thinks it right to notice the additions which have been made to it. The quantity of letter press is increased full a third ; much of the original matter has been obliterated, to make room for other subjects that were deemed more useful and interesting. The former edition was composed chiefly with a view to **Polite Literature** and the **Arts** ; in the present is combined a vast quantity of materials connected with the **Sciences** properly so denominated.

In **Natural Philosophy**, a variety of articles will be found in their respective places, such as **Electricity**, **Hydraulics**, **Hydrostatics**, **Magnetism**, **Mechanics**, **Optics**, **Pneumatics**, and **Voltaism**. These have been explained and illustrated with many well-engraved plates.

A brief introduction to **Chemistry** will be found under the proper term, connected with the articles **Chemical Apparatus**, **Distillation**, **Hydrogen**, **Laboratory**, **Metals**, **Mineralogy**, **Oxygen**, &c.

POCKET ENCYCLOPEDIA.

A

A is the first letter of the alphabet in every known language, except that of Ethiopia; its Greek name is Alpha, from the Hebrew Aleph, which is very significant, denoting either an ox or a leader; each a mark of excellence or priority. The first place is deservedly given to this letter on account of its simplicity, and the ease with which it is pronounced; the first sound uttered by human creatures in their most infantile state, being that by which this letter is expressed.

In the English language, this letter has four different sounds. The broad sound, as in all, wall. The open, as in father, rather. The slender or close, which is the peculiar *u* of the English, exemplified in place, face, &c. And the short sound, of which we have instances in hat, cat, fat.

In numerals A denoted 500, and \bar{A} 5,000. In the Italian calendar, A, is the first of the seven dominical letters.

A, as a word, has the following significations: A, an article set before nouns of the singular number; a man, a tree. Before a word beginning with a vowel, it is written *an*; as, an ox

A, in abbreviations, stands for artium, or arts; as, **A. M.** artium magister; or anno; as **A. D.** anno domini.

In medical prescriptions, this letter with a dash above it, \bar{a} , is used for ana, of each.

In music **A** is the nominal of the sixth note in the diatonic scale: it is also the name of one of the two natural moods.

ABACUS, in architecture, the superior member of the capital, to which it serves as a kind of crown. It was originally intended to represent a square tile laid over a basket; and it still retains its original form in the Tuscan, Doric, and Ionic orders; but in the Corinthian and Composite, its four sides or faces are arched inwards, having some ornament, as a rose or other flower, in the middle.

Abacus, Pythagorean, so denominated from its inventor, Pythagoras; a table of numbers, contrived for readily learning the principles of arithmetic, and was probably what we now call the multiplication table.

Abacus Logisticus is a right angled triangle, whose sides, about the right angle, contain all the numbers from 1 to 60; and its area the products of each two of the opposite numbers. This is called a canon of sexagesimals, and is no other than a multiplication table carried to 60 both ways.

Abbe, a french word, literally meaning an abbot. The abbots of France, however, were divided into two classes; and these became so totally different from each other, that the character generally spoken of under the name of abbé, has long ceased to be of any official nature. Its origin must be dated about the middle of the seventeenth century;

and, from its institution, which will be seen by referring to the article **ABBOT**, it is plain, that it was not at first, what it latterly has been, a perfectly empty title. Of the modern abbé, in the confined acceptation of the term, to which the present definition is restricted, it is not easy to give a precise account. It is a nominal abbotship which neither imposes duty, nor conveys emolument, but is valuable on account of the respect in which it is held by society, and the consequent assistance that it affords to advancement in church or state. In short, it is a station in which a man of liberal education and little wealth waits, as it were, for the favours of fortune.

ABBESS, in catholic countries the superior of an abbey of nuns, or of a community or chapter of canonesses. An abbess was formerly elected by her community, but latterly, with scarcely any other exceptions than those of St. Clare, they have been in the royal gift. To preserve, however, an appearance of the ancient freedom of choice, the pope's bull, by which they are severally confirmed in their offices, states, that they have been recommended by a letter from their king, and approved of by a majority of the nuns. An abbess exercises all the functions of an abbot, with the exception of those which appertain to his priesthood.

ABBAY. The abbeys of England, as those of Westminster and Bath, are churches which formerly belonged to such houses of monks or nuns as were governed by an abbot or abbess. At present, an abbey is, in general, the cathedral or episcopal church of the see or diocese in which it stands; and on that account retains the more ancient and

solemn, but expensive, form of divine worship. The abbey at Westminster still possesses this distinguishing feature, as a *collegiate* church; and the church of Saint Paul, is the cathedral of the diocese of London.

ABBOT signifies FATHER, and is a corruption of AB; which, in the Hebrew imports, first, a natural father; and, secondly, by figure, a person to whom filial reverence is due. It is easy to perceive, that the custom of calling superiors "fathers," has descended from those early ages of the Jews in which the government of each family was held by its patriarch or parent; but it is somewhat remarkable, that it should have obtained general use among Christians, whom Jesus, alluding to the arrogance with which the Jewish doctors assumed the title, enjoined to call no one on earth their father: because they have but one father, who is in Heaven. 'Father,' however, notwithstanding this command, is the distinction by which the monks, priests, and bishops of the Roman church have always been addressed. From *ab*, *abba*, *baba*, or *papa* (grand or pre-eminent father,) is derived the French *pape*, and the English *pope*, the chief of the church; and *abba*, which makes *abbé* in the French, the superior of a monastery. An abbot was, originally, a plain monk, to whom the care of his monastery was committed. He lived like the other monks, except that he had a separate table for the reception of guests, a duty which was one of the prominent motives for the foundation of monasteries. An abbot has a jurisdiction over priories, and is consequently of higher rank than a prior. He has three sorts of authority: the first

consists in the maintenance of order among the monks, in the repair of the building, and the management of its estates; the second, in regulating divine service, in receiving the vows of those who enter into the society, giving the tonsure, and bestowing the benefices or livings that are in the gift of the monastery; the third, in correcting, excommunicating, and suspending offenders. It was because certain abbots and priors in England, in right of their monasteries, held lands of the crown, for which they owed military service, that they obtained the title of LORDS, and were summoned, as barons, to parliament; and from this custom, bishops, in modern times, have the same honour.

ABBREVIATION OF FRACTIONS, in arithmetic and algebra, the reducing them to lower terms: that is, the proportional lessening of both the numerator and denominator. This may be performed either by continual division of the respective terms, or by dividing at once by the greatest common-measure. Thus $\frac{48}{72} = \frac{16}{24} = \frac{4}{6} = \frac{2}{3}$: by dividing both terms continually by 3, 4, and 2. Or, since 24 is the greatest common measure we have, at once, $\frac{48}{72} = \frac{2}{3}$, by dividing by 24.

ABDOMEN, in anatomy, the lower part of the trunk of the body reaching from the thorax to the bottom of the pelvis.

ABDOMINALES, an order of fishes having ventral fins placed behind the pectoral in the abdomen. This order contains sixteen genera.

ABERRATION, in astronomy, a small apparent motion of the celestial bodies, occasioned by the progressive motion of light; and the earth's ad-

annual motion in her orbit. The word is compounded of *ab* from, and *erro* to wander, because the stars appear to wander from their true situations. This apparent motion is so minute, that it could never have been discovered by observations, unless they had been made with extreme care and accuracy; and although it naturally arises from the combination of the two causes just mentioned, yet as it was never even suggested by theorists, until it was discovered by observation, it furnishes us with one of the strongest proofs of the truth of the Copernican system. The discovery is owing to the accuracy and ingenuity of Dr. Bradley, astronomer royal: he was led to it accidentally by the result of some careful observations, which he had made with a view of determining the annual parallax of the fixed stars.

Aberration, in optics, that error or deviation of the rays of light, when inflected by a lens or speculum, whereby they are hindered from meeting or uniting in the same point, called the geometrical focus; it is either lateral or longitudinal. The lateral aberration is measured by a perpendicular to the axis of the speculum, produced from the focus, to meet the reflected or refracted ray: the longitudinal aberration is the distance of the focus from the point in which the same ray intersects the axis.

ABEYANCE, in law-books, something that only exists in expectation, or in the intendment, or remembrance of the law.

ABJURATION. A forswearing, or renouncing by oath: in the old law it signified a sworn banishment, or an oath taken to forsake the realm for

ever. In its modern, and now more usual signification, it extends to persons, and doctrines, as well as places. Thus for a man to abjure the pretender by oath, is to bind himself not to own any regal authority in the person called the Pretender, nor even to pay him any obedience, &c.

ABLUTION, a ceremonious washing of the whole, or part of the body, instituted by the several founders of the religions of the East, for the prevention of those disorders that, especially in warm climates, result from the filth in which the greater part of the people were, and still are condemned to live. For this purpose it was made a religious rite; and by an easy transition of idea, the purity of the body was made to typify the purity of the soul: an idea the more rational, as it is perhaps physically certain that outward wretchedness debases the inward mind. A frequent change of the clothes next the skin, affords, perhaps, especially in cold countries, the same advantages as ablution; and hence, in Europe, the custom has almost universally fallen into disuse. Ablution is still practised in Turkey, as well as in most other parts of the ancient continent.

ABOMASUS, a name used for the fourth stomach of ruminating beasts, or such as chew the cud. These have four stomachs: the last, where the chyle is formed, and from which the food descends into the intestines, is called the Abomasus.

ABORIGINES, originally a proper name, given to a certain people in Italy, who inhabited the ancient Latium, or country now called Campagna di Roma. Whence this people came by the appellation is much disputed. The name is now given to

the primitive inhabitants of a country, in contradistinction to colonies, or new races of people.

ABRIDGEMENT, in a literary sense, is the compression of the matter of a work into a smaller compass than that in which it has been originally written. With respect to private abridgements and commonplace books, theorists in education have frequently taken pains to engage youth in their compilation. On this subject, however, it may be doubted whether the practice will confer any advantage, and even suspected that it may do much mischief. If the mind is desirous of acquiring a thorough knowledge of any particular subject, the notation of facts, dates, &c. will, no doubt, most effectually enable it to accomplish the purpose; but where this is not the design, the time that is devoted to the tedious task of copying one author, had better be employed in reading twenty. If, as has been said before, any minute study is the object, copying is useful; but if it be done merely to assist the memory with sentiments, terms of expression, &c. it is wrong: for the habit of making memorandums, by discharging memory from its office, takes from it every opportunity of improvement.

ABSCISS, or **ABSCISSA**, of a conic section, or other curve, is a part or segment cut off by a line at some certain point, which is determined by an ordinate to the curve.

ABSORBENTS, calcarious earths, or other medicines which soak up the redundant humours of the body. Also, a system of vessels that absorb and convey fluids from every cavity of the body to the thoracic duct, which is their common trunk. These last are likewise denominated lymphatics, and those of the

smaller intestines, from the milky hue of the fluid in most animals, lacteals.

ABSTINENCE may be defined, the habit of refraining from what is either useful, agreeable, or pernicious. The Christian system more particularly enjoins the discipline of the passions, and an abstinence from those pleasures which have a tendency to degrade our nature. In England, certain days have been appointed, called vigils and fasts, in which flesh is prohibited, and fish enjoined: this, however, being more a political restriction than a religious obligation, was first enacted in the reign of queen Elizabeth, with a view to encourage our fisheries. Of the brute animals, many are remarkable for their long abstinence from food, such as the serpent, the rattlesnake, tortoise, bear, dormouse, elephant, &c. Instances may also be found of men who have been abstemious to a degree almost incredible; and experience has demonstrated that, from habit and use, the power of abstinence may be either increased or diminished.

ABYSSINIA, is bounded on the north by Nubia; on the east by the Arabian gulf, or Red Sea, and the kingdom of Adel; on the south by the kingdoms of Ajan, Alaba, and Gingiro; and on the west by the kingdom of Gorem, and part of Gingiro. In this country the famous river Nile has its source. On the mountains the air is pretty temperate; therefore their towns and fortresses are generally placed on them; but in the valleys the heat is intense. The torrents of water in the rainy seasons wash a great deal of gold from the mountains. These seasons commence in May, and end in September. The inhabitants of this country, in

general, are of an olive complexion, tall, graceful, and well featured. Their language is the Ethiopic, which bears a great affinity to the Arabic. Gold, silver, copper, and iron, are the principal ores which abound there, but not above one third part of their gold is converted into money, or used in trade.

ACADEMICS, a sect of philosophers, who followed the doctrine of Socrates and Plato, as to the uncertainty of knowledge, and the incomprehensibility of truth. Academic, in this sense, amounts to much the same with Platonist; the difference between them being only in point of time. They who embraced the system of Plato, among the ancients, were called *Academici*; whereas those who did the same since the restoration of learning, have assumed the denomination of Platonists.

ACADEMY, in the modern acceptation, is a society of persons united for the pursuit of some objects of study and application, as the Royal Academy of Arts of London, and the Royal Academy of Sciences of Berlin. The term is derived from a house and gardens, once the residence of Academus, a celebrated Athenian, in which Plato and his disciples held philosophical conversations.

ACCELERATION, in mechanics, the increase of velocity in a moving body. Accelerated motion is that which continually receives fresh accessions of velocity, and is either equally or unequally accelerated. Acceleration stands directly opposed to Retardation, which denotes a diminution of velocity. See **MECHANICS**.

ACCENT, is 1. The manner of speaking or pronouncing. 2. The sound of a syllable. 3. The

marks made upon syllables to regulate their pronunciation. 4. A modification of the voice, expressive of the passions or sentiments. It is also used for a character placed over a syllable, to mark the accent, i. e. to shew it is to be pronounced in a higher, or in a lower tone; and to regulate the inflexions of the voice in reading. It is distinguished from emphasis, as the former regards the tone of the voice, the latter the strength of it. We reckon three grammatical accents in ordinary use, all borrowed from the Greeks, viz. the acute accent, which shews when the tone of the voice is to be raised. In modern writings it is a little line, or virgula, placed over the vowel, a little sloping or inclined, in its descent, from right to left, as '. It is not ordinarily used, either in English or Latin: the French, indeed, retain it; but it is only to mark the close or masculine é. The grave accent, when the note or tone of the voice is to be depressed; and is figured thus '. The circumflex accent, which is composed of both the acute and the grave; it points out a kind of undulation of the voice, and is expressed thus ~ or ^.

Accent, in music, is a modulation of the voice, to express a passion. Every bar or measure is divided into accented and unaccented parts. The accented parts are the principal; being those intended chiefly to move and affect; it is on these the spirit of the music depends.

ACCEPTANCE, in commerce, is when a man subscribes, signs, and makes himself a debtor for the sum contained in a bill of exchange, or other obligation, drawn upon, or addressed to him; as thus:

somewhat hooked downwards, the upper mandible dilated near the point, or armed with a tooth; nostrils open; legs short, and strong; feet formed for perching, having three toes forwards and one backwards; toes warty under the joints; claws hooked and sharp pointed; body muscular; flesh tough and not fit to be eaten; food, the carcasses of other animals, which they seize and tear; nest in high places: eggs about four; female larger than the male: they live in pairs. The birds of this order subsist by preying on other animals. There are four genera, viz. the *Vultur*, *Falco*, *Strix* and *Lanius*.

ACCOLADE, a ceremony practised in the days of chivalry, in conferring knighthood. The word obviously means something done to the neck. It is probable that, with the simplicity of ancient times, the sovereign originally embraced the hero whom he intended to dignify. This familiar expression of regard appears to have been exchanged for the more stately act of touching, or gently striking, with the royal sword, the neck of the kneeling knight. The form now used in *dubbing* a knight is, doubtlessly, a remain of the ancient accolade.

ACETATES; in chemistry, certain neutral salts formed by the combination of the acetic acid, or radical vinegar, with different substances, or bases. These salts differ from acetites in this respect; the acid employed in the production of the former is fully saturated with oxygen, or the acidifying principle, that is, it is completely acid; while that which is used to form the latter, contains a less proportion of oxygen than is sufficient to saturate it. The different acetates are expressed by the addition

of the word denoting the substance to which the acid is united, as acetate of lime, &c.

ACETIC ACID, in chemistry, one of the vegetable acids, produced by distilling the acetous acid with metallic oxydes. It is of a green colour, but becomes white by rectification. It is extremely volatile and inflammable; corrodes and cauterizes the skin; and when heated in contact with air, takes fire. Combined with earths, alkalies, and minerals, it forms salts called acetates.

ACETITES, compound or neutral salts, formed by the union of the acetous acid, or distilled vinegar, with different bases: the most remarkable of these substances, and those whose properties are best known, are the acetite of alumene, copper and lead.

Acetous Acid, distilled vinegar, or the acid of vinegar, is obtained from mucilaginous substances by that degree of fermentation which succeeds the spirituous, called the acetous fermentation, and by concentrating the product. It is a transparent colourless fluid, of the specific gravity of 1.0095, nearly as volatile as water, exhaling a pungent fragrant odour, and of a lively agreeable taste.

ACID, in chemistry, the generic name of a comprehensive class of substances, which possess the following properties: sourness of taste; a power of changing blue vegetable colours to red; of forming with water a combination whose specific gravity is not a medium between the water and the acid; and of combining (and usually effervescing) with all the alkalies, and most of the metallic oxydes and earths, by which means those compounds are formed which are called neutral, or secondary salts. Though every acid does not possess all

these properties, yet they all possess a sufficient number of them to distinguish them from other substances. The form under which acids most commonly appear, is that of a transparent liquor, in which case they are generally combined with a greater or less quantity of water; several of them, however, are found in a solid state, as Benzoic acid, or the flowers of Benzoin; and some exist in a state of gas: as carbonic acid gas. Acids are divided into four classes, according to their bases or radicals. First, those with simple radicals, of different kinds. Secondly, those with double radicals, viz. carbon and hydrogen, in different proportions. Thirdly, those with triple radicals, carbon, hydrogen, and azote. And fourthly, those with unknown radicals. The old chemists were only acquainted with the three mineral acids, as they are called, the sulphuric, the nitric, and the muriatic, besides the acetous acid, or vinegar.

ACIDULATED WATERS, generally called *Acidule*, a species of mineral waters, which contain a considerable quantity of carbonic acid, and which are known by the poignancy of their taste, the sparkling appearance which they assume when shaken or poured from one vessel into another, and the facility with which they boil.

Acis, in fabulous history, the son of Faunus and Simethus, was a beautiful shepherd of Sicily, who being beloved by Galatea, Polyphemus the giant was so enraged, that he dashed out his brains against a rock; after which Galatea turned him into a river, which was called by his name.

ACOUSTICS is the science which instructs us in the nature of sound. It is usually divided into

two parts, viz. 'diacoustics,' which explains the properties of those sounds that come directly from the sonorous body to the ear; and 'catacoustics,' which treats of reflected sounds. Almost all sounds that affect us are conveyed to the ear by means of the air; but water is a good conductor of sound; so also are timber and flannel.

A bell rung under water returns a tone as distinct as if rung in the air.

Stop one ear with the finger, and press the other to one end of a long stick, or piece of deal wood, and if a watch be held at the other end of the wood, the ticking will be heard by the wood or stick ever so long.

Tie a poker on to the middle of a strip of flannel, two or three feet long, and press with the thumbs or fingers the ends of the flannel into your ears, while you swing the poker against an iron fender, and you will hear a sound like that of a very heavy church bell. These experiments prove that water, wood, and flannel are good conductors of sound, for the sound from the bell, the watch, and the fender pass through the water, and along the deal and flannel to the ear.

It must be observed, that a body, while in the act of sounding, is in a state of vibration, which it communicates to the surrounding air, the undulations of the air affect the ear, and excite in us the sense of sound. Sound, of all kinds, it is ascertained, travels at the rate of thirteen miles in a minute: the softest whisper travels as fast as the most tremendous thunder. The knowledge of this fact has been applied to the measurement of distances.

Suppose a ship in distress fire a gun, the light of which is seen on shore, or by another vessel, 20 seconds before the report is heard, it is known to be at the distance of 20 times 1,142 feet, or little more than four miles and a half.

Again, if I see a vivid flash of lightning, and in two seconds hear a tremendous clap of thunder, I know that the thunder cloud is not more than 760 yards from the place where I am, and should instantly retire from any exposed situation.

The pulse of a healthy person beats about 76 times in a minute; if, therefore, between a flash of lightning and the thunder, I can feel 1, 2, 3, 4, &c. beats of my pulse, I know the cloud is 900, 1,800, 2,700, &c. feet from me.

Sound, like light, after it has been reflected from several places, may be collected into one point as a focus, where it will be more audible than in any other part: on this principle whispering galleries are constructed. Suppose fig. 1, plate 1, to represent the concave hemisphere of such a gallery, if a sound be uttered at A, its vibrations expanding every way on the points D, D, &c. will be reflected to E, E, &c., thence to F, F, G, G, &c. till they all meet in C, the opposite part of the gallery, where the sound is distinctly heard.

Speaking trumpets, and those intended to assist the hearing of deaf persons, depend on the reflection of sound from the sides of the trumpet, and also upon its being confined and prevented from spreading in every direction. A speaking trumpet, to have its full effect, must be directed in a line towards the hearer. The report of a gun is much louder when fired towards a person, than one

placed in a contrary direction. Thus, in fig. 2, the sound is received in the open part A C, and is eventually reflected from all sides into the line D B, by which it is sent to the hearer.

An echo is the reflection of sound striking against a surface adapted to the purpose, as the side of a hill, house, wall, &c. Thus fig. 3, if a person stand at *m*, and the bell *a* be struck, the sound along *a x* will proceed to the wall and be reflected from *c* to *m*, so that a person standing at *m* will hear the direct sound coming along *a m*, and afterwards, the reflected sound or echo, along *c m*.— See MUSIC.

ACQUITTAL, a discharge, deliverance, or setting free of a person from the guilt or suspicion of an offence. Acquittal is of two kinds; in law, and in fact. When two are appealed or indicted of felony, one as principal, the other as accessory, the principal being discharged, the accessory is, by consequence, also freed: in which case, as the accessory is acquitted by law, so is the principal in fact.

ACRE, a measure of land very general in name, but differing almost in every two places as to the extent which it is intended to denote. A statute-acre in England contains four square roods; a rood, containing forty perches or poles, of sixteen feet and a half each; but, in different countries, the length of the pole varies, from the statute measure of sixteen feet and a half, to twenty-eight: these several lengths are called *customary measures*. In Scotland, the acre is larger than in England. The French acre contains one English and a half. The Strasburgh acre is about half an English acre. The Welsh acre commonly contains two English.

The Irish acre is equal to one acre, two roods, $19 \frac{27}{28}$ perches English.

ACRONYCHAL, in astronomy, is applied to a star or planet, when it is opposite to the sun. It is from the Greek, signifying the point or extremity of night, because the star rose at sun set, or the beginning of night, and set at sun-rise, or the end of night ; and so it shone all the night. The acronychal is one of the three Greek poetic risings and settings of the stars ; and stands distinguished from cosmical and heliacal. By means of which, for want of accurate instruments, and other observations, they might regulate the length of their year.

ACROSTIC, a poem, the lines of which are so contrived, that the first letters of each, taken together, will make a proper name or other word.

Act. **Act**, in the universities, is the delivery of orations, or other exercises, in proof of the proficiency of a student who is to take a degree. At Oxford, the time when masters or doctors complete their degrees, is called the *act*. At Cambridge, the same period is called the *commencement*.

Act of Faith, or *auto-da-fé*. In dark and barbarous countries where the Spanish inquisition had power, the *act of faith* was a solemn murder of infidels and heretics, usually performed on some great festival, and always on a Sunday.

Act of Parliament is a positive law, consisting of two parts, the words of the act, and its true sense and meaning ; which, being joined, make the law. The words of the acts of parliament are to be taken in a lawful sense. Cases of the same nature are within the intention, though without the letter, of the act ; and some acts extend, by equity, to cases not mentioned therein.

ACTION, in law, denotes either the right of demanding in a legal manner, what is ones due, or the process brought for the recovering the same.

ACTS OF THE APOSTLES, a canonical book of the New Testament, which contains great part of the lives of St. Peter and St. Paul ; commencing at the ascension of our Saviour, and continued down to St. Paul's arrival at Rome, after his appeal to Cæsar ; comprehending in all about thirty years. St. Luke has been generally taken for the author of this book, and his principal design in writing it was to obviate the false acts, and false histories, which began to be dispersed up and down the world. The exact time of his writing is not known ; but it must have been at least two years after St. Paul's arrival at Rome, because it informs us that St. Paul dwelt two whole years in his own hired house ; perhaps he wrote it while he remained with St. Paul, during the time of his imprisonment. The council of Laodicea places the Acts of the Apostles among the canonical books, and all the churches have acknowledged it as such without any controversy. The truth and divine original of Christianity, may be deduced from a comparison of the Acts of the Apostles, with the other received books of the New Testament. To this end Dr. Paley has, in his very masterly work, entitled *Horæ Paulinæ*, brought together from the Acts of the Apostles, and from the different Epistles of Paul, such passages as furnish proof of undesigned coincidence ; and which, therefore, are so many independent proofs of the authenticity both of the Acts and those Epistles.

ACUTE DISEASES, are distinguished from **CHRONIC**, which latter are of greater duration and slower progress. Acute diseases are attended with violent

symptoms, and require immediate aid : chronic diseases are those which usually last long.

ADIT OF A MINE, the hole, or aperture, whereby it is entered and dug, and by which the water and ores are carried away. The term amounts to the same with *cuniculus* or drift, and is distinguished from an air-shaft. The adit is usually made on the side of a hill.

ADJUTANT, a military officer, whose duty it is to carry orders from the major to the colonel and sergeants. When detachments are to be made, he gives the number to be furnished by each company or troop, and assigns the hour and place of rendezvous. He also places the guards, receives and distributes the ammunition to the companies, &c.; and, by the orders of the major, regulates the prices of provisions.

ADJOURNMENT, the putting off a court or other meeting till another day. In parliament, adjournment differs from prorogation, the former being not only for the shorter time, but also done by the house itself, whereas the latter is an act of royal authority.

ADMINISTRATOR, in law, is he to whom the administration of the goods of a deceased person, in default of an executor, is committed. If the administrator die, his executors are not charged with the administration; but a new administration is granted. This office was established by an act made in the 31st year of Edward III.

ADMIRAL, in England, a great naval officer, who has the government of a navy, and the hearing of all maritime causes.

Admiral, Lord High of England, a great officer of state, who presides over all persons and matters

connected with the navy. His office is of such high antiquity, and his powers so very unlimited, that its authority is defined rather by what it is not, than by what it is. Ever since the reign of queen Anne, the duties of lord high admiral have been executed by commissioners, commonly known by the title of Lords of the Admiralty.

Admiral, is also the commander in chief of any single fleet, or, in a general way of speech, any flag-officer whatever, as, though improperly, vice and rear admirals are called admirals.

Vice-Admiral, is the commander of the second squadron, and carries his flag at the fore-topmast head.

Rear-Admiral, is the commander of the third squadron, and carries his flag at the mizen-topmast head.

Vice-Admiral, is also an officer appointed by the lords-commissioners of the admiralty for executing jurisdiction within prescribed limits.

Admiralty, Court of, is a sovereign court held by the lord high admiral, or by the lords commissioners of the admiralty, where cognizance is taken in all maritime affairs, whether civil or criminal. All crimes committed on the high seas, or on great rivers below the first bridge next the sea, are cognizable in this court only, before which they must be tried by a judge and jury. By the late act of the 39th of his present majesty, it is enacted, "That all offences committed upon the high seas, out of the body of any county, shall be, and are declared to be, offences of the same nature respectively, as if they had been committed upon the shore. In consequence of which act, all offences

committed on the high seas are now to be heard and determined before a jury, as at common law. In civil matters, the verdict lies in the breast of the judge ; but there is an appeal to the court of delegates ; and from the vice-admiralty courts in foreign settlements an appeal may be brought before the court of admiralty here, or before the king in council. The advantages resulting to mariners from suing in the court of admiralty, rather than in the common courts of law, are, 1st. A whole ship's company may join in a suit for wages, by which means the expence is lessened ; and 2d. The ship itself is responsible to the admiralty, and not to the owners. A third province of the court of admiralty relates to the law of nations. It belongs to this court to decide whether a captured ship be a lawful prize or not ? If the affirmative is declared, the ship is said to be condemned.

ADVERB, a word joined to verbs, expressing the manner, time, &c. of an action. Example. It is conducive to health to rise *early* : here the word *early* is an adverb, and is joined to the verb *rise*.

ADVOWSON, signifies a right to present to a vacant benefice. This right is so called because it was first gained by such as were founders, benefactors, or maintainers of the church. Advowsons are either *presentative*, as when the patron presents or offers his clerk to the bishop to be instituted ; *collative*, as where the benefice is given by the bishop, as original patron thereof, or by means of the right he has acquired by lapse ; or *donative*, as where the king, or other patron, does, by a simple donation in writing, put the clerk into possession, without presentation, institution, or induction.

ÆNIGMA, or *Enigma*, is commonly called a riddle. The Greek words of which the term is formed, mean an obscure hint or saying. Enigmas may be either painted or written. The true end of language and of arts, however, is to enlighten, and not to obscure. Enigmas were the invention of intelligent men, who had the misfortune to live in countries, and in ages, where and when truth could not be openly spoken : a state of things which gives birth to wit of various kinds. In modern times, enigmas can serve no other purpose than that of enabling the inventor or propounder to obtain a contemptible triumph over those who do not happen to guess their meaning. An aptitude at unravelling them is, on the other hand, a talent scarcely to be desired. In all periods, enigma-makers seem to have endeavoured rather to intrap than to inform. This is a fact so true, that the understanding of enigmas, or dark sentences, became proverbial among the Hebrews, intimating skill in deception.

ÆOLIPILE, in hydraulics, a hollow ball of metal, with a small hole or opening ; chiefly used to shew the convertibility of water into elastic steam. The best way of fitting up this instrument, is with a very slender neck or pipe, to screw on and off, for the convenience of introducing the water into the inside ; for by unscrewing the pipe, and immersing the ball in water, it readily fills, the hole being pretty large ; and then the pipe is screwed on. But if the pipe do not screw off, its orifice is too small to force its way in against the included air ; and therefore to expel most of the air, the ball is heated red hot, and suddenly plunged with its orifice into water, which will then rush in till the

ball is about two-thirds filled with the water. The water having been introduced, the ball is set upon the fire, which gradually heats the contained water, and converts it into elastic steam, which rushes out by the pipe with great violence and noise ; and thus continues till all the water is so discharged ; though not with a constant and uniform blast, but by fits : and the stronger the fire is, the more elastic will the steam be, and the force of the blast. Care should be taken that the ball be not set upon a violent fire with very little water in it, and that the small pipe be not stopped with any thing ; for in such case, the included elastic steam will suddenly burst the ball with a very dangerous explosion.

ÆOLUS'S HARP, a very pleasing musical instrument, invented by Kircher. The construction is perfectly simple, consisting of little more than a number of catgut or wire strings, distended in parallel lines over a box of wood, with a thin top containing sound-holes. When the strings are tuned in unison, and the instrument is placed in a proper situation to receive a current of air, it produces, by the tremulous motion given by the wind to the strings, a soft, murmuring, and pleasing combination of sounds, which is beautifully described by Thomson in his *Castle of Indolence*. Fig.3.

ÆTIOLATION, a term denoting the state of vegetables which, by growing in the shade, and being deprived of light, become pale, white, and insipid. How this change is produced, the present state of our knowledge will not permit us to explain ; but it is a fact of general observation, that the colour of herbs is pale or deep in proportion as they are less or more exposed to the rays of the sun ; and those

which, for the want of those rays, are pale or white, are said to be *ætiolated*, from a French word signifying star, as if they grew by star-light.

ÆRA, or *Era*, a fixed historical period whence years are reckoned : as the building of Rome, or the birth of Christ. See *EPOCH*.—Era and Epoch are not exactly synonymous. An era, is a point fixed by a particular people or nation ; an epoch, one determined by chronologists and historians. The idea of an era, also, comprehends a certain succession of years, proceeding from a fixed event ; and an epoch is that event itself. Thus, the christian era began at the epoch of the birth of Christ. See *CHRONOLOGY*.

AERONAUT, one who sails in the air. The term is applied to a person who ascends with an air-balloon.

AEROSTATION, aerial navigation, or the art of passing through the atmosphere in a buoyant state. Hence, also, the machines which are employed for this purpose are called aerostats, or *aerostatic machines*, and, from their globular shape, *balloons*. In the ancient history or romance of almost every nation, instances of persons travelling through the air have been related ; and among the philosophers of Europe, since the revival of letters, the possibility of a mechanical contrivance, by means of which a man might rise into the air, or at least descend from heights with safety, has sometimes been discussed. The first experiments that may be strictly said to have introduced balloons, were made about the year 1766. In the year 1781, the Montgolfiers, considerable paper-manufacturers of Annonay, in France, raised a fine silk bag, of an elongated oval shape, to the height of seventy feet.

M. Pilatre-de-Rozier, who afterward fell a sacrifice to the project, was the first to ascend with a balloon. His voyage took place on the 15th of October, 1783, from the neighbourhood of Paris. The success of former experiments, induced M. M. Charles and Roberts to make an attempt, upon a principle somewhat different from those that had been employed, with a balloon of a spherical form. They rose from Paris, and descended at the distance of twenty-seven miles. There, M. Roberts left the boat or car; but the balloon still retaining a considerable quantity of inflammable gas, and its burthen being thus lightened, M. Charles resolved to take another voyage by himself. He was carried up with so much velocity, that in twenty minutes he was almost 9000 feet high, and entirely out of sight of terrestrial objects. At the moment of his parting from the ground, the globe had been rather flaccid; but it soon began to swell, and the inflammable air escaped from it in great quantity, through the silken tube. He frequently opened the valve, that it might be the more freely emitted, and the balloon effectually prevented from bursting. The heat of the inflammable gas being considerably greater than that of the external air, the former diffused itself all around, and was felt like a warm atmosphere; but, in the space of ten minutes, the thermometer indicated a variation of temperature as great as that between the warmth of spring and the ordinary cold of winter. M. Charles's fingers were benumbed by the cold; and he felt a violent pain in his right ear and jaw, which he ascribed to the dilatation of the air in these organs, as well as to the external cold. The beauty of the prospect which at this

juncture presented itself, made amends, however, for these inconveniences. At his departure, the sun was set on the valleys ; but the height to which M. Charles was got in the atmosphere rendered its orb again visible, though only for a short time. He saw, for a few seconds, vapours arising from the valleys and rivers. The clouds seemed to ascend from the earth, and collect, one upon another, still preserving their usual form ; though their colour was grey and monotonous for want of light in the atmosphere. By the radiance of the moon, he perceived that the machine was turning round with him in the air ; and he observed that there were also contrary currents which brought him back again. He beheld, with surprize, from some unusual effect of the wind, the streamers of his banners pointed upward ; a circumstance which, as he was moving horizontally at the time, cannot be attributed either to his ascent or descent. At last, recollecting his promise of returning to his friends in half an hour, he pulled the valve, to release a portion of the gas. When within 200 feet of the earth, he threw out 2 or 3 pounds of ballast, which rendered the balloon again stationary ; but in a little time afterward he gently alighted in a field about 3 miles distant from the place where he set out ; though, making allowance for all the turnings and windings of the voyage, he supposed that he had travelled 9 miles at least. By the calculations of Maunier, he rose 10,500 feet ; a height somewhat greater than that of Mount Etna. During this voyage, the idea of guiding the machine by means of oars suggested itself to M. Charles ; and this new experiment was made by M. Blanchard, who found, however, that

the strength he could apply in his apparatus was not great enough to counter-act, in any sufficient degree, the impression of the wind.

The only expedition in which a balloon has appeared to accomplish a practical purpose, was that of M. Blanchard and Dr. Jefferies, who, in the month of January, 1785, crossed the straits of Dover, and in the space of about 3 hours alighted safely in the forest of Guiennes. In the month of September, in the same year, Mr. Baldwin ascended from Chester in Mr. Lunardi's balloon. His account of the prospect which the earth afforded is extremely curious. At the height of what appeared 7 miles, though, by the barometer, it was only a mile and a half, he had a grand and most enchanting view of the city of Chester and its environs. The river appeared of a red colour ; the city of a blue, and very diminutive. The whole looked a perfect plain ; the highest building having no apparent height, and every thing seeming reduced to the same level. The lowest bed of vapour was of a pure white, in detached pieces, uniting as they rose : at the second height, the clouds appeared, to use Mr. Baldwin's expression, as a sea of cotton, tufted here and there by the action of the air. The prospect presently became an extended white floor of cloud, the upper surface being smooth and even. Above this white floor, Mr. Baldwin observed, at great and unequal distances, a vast assemblage of thunder-clouds, each parcel containing whole acres in extent, of the densest form ; he compares their shape and appearance to the smoke of pieces of ordnance, consolidated, as it were, into masses of snow, and penetrating through the upper

surface of common clouds, and there remaining and visible at rest; while some, moving slowly in various directions, completed a view truly majestic.

As we cannot give a detail of all the aerial voyages made in this and other countries, we shall only mention those of Mr. Garnerin, in one of which he ascended at Ranelagh, near London, and descended at Colchester, a distance of 60 miles in about 8 quarters of an hour. This was in June 1802: but in September, he ascended from North Audley-street, London, in order to shew that he could come down in safety, by means of a parachute: which he did, in a field near St. Pancras church. The balloon used on this occasion, was of the common sort, viz. of oiled silk, with a net, from which ropes proceeded that terminated in or were joined to a single rope, at a few feet below the balloon. To this rope the parachute was fastened. The parachute was a large umbrella, about 30 feet in diameter, but destitute of ribs or handle. Several ropes about 30 feet in length, proceeded from the edge of the parachute terminating in a common joining, from this, shorter ropes were fixed, to the extremities of which a circular basket was fastened. In this Mr. Garnerin placed himself, and when every thing was steady, he cut the rope, and in an instant was separated from the balloon, trusting his safety to the parachute. For a few seconds, before the parachute opened, he fell with very great velocity, but as soon as that expanded the descent became gradual. On coming to the earth, Mr. Garnerin experienced some pretty severe shocks, but without receiving any material injury. Fig. 4. represents a balloon in its ascent: and fig. 5. Garnerin as coming down by means of the parachute.

As *hydrostatics* is the science of the weight of water, so *aerostatics* is that of the weight of air: air and water are both fluids: and a balloon rises into the one, upon the same principle that a vessel floats upon the other. Air is lighter than water; and, therefore, a body, containing a quantity of air greater in bulk than the water it displaces, will swim; and rarefied or inflammable air being lighter than the common atmosphere, a body containing either the rarefied or inflammable air will ascend till its nature is altered, or it arrives in a fluid as light as itself, and consequently has gained the surface of the heavy atmosphere. The most familiar exposition of this principle that can be offered, may be seen in those air-bubbles which, on pouring water rapidly into a glass, arise, with the utmost velocity, from the bottom to the surface, and there, becoming stationary, form a temporary froth. The water represents the air, and the air-bubble the balloon. See more on this subject under the article PNEUMATICS.

ÆTHER, or *Ether*, a thin, subtle, and perfectly pure fluid. The term is used by natural philosophers ancient and modern; but the thing or matter meant is variously described. According to electricians, it is the electric fluid, or solar light. It may be understood to be a fluid that fills all space; in which the stars revolve; and which, when impregnated with earthy exhalations, forms the air or atmosphere. In this sense, ether is what is called rarefied air: that is, ether disburdened of intermingling particles. See *Air*.

ÆTNA. A volcano or burning mountain of Sicily, situated in lat. 38. N. long. $15\frac{1}{2}$. E.—This mountain, famous from the remotest antiquity both for

its bulk and terrible eruptions, stands in the eastern part of the island, in a very extensive plain, called Val Demoni, from the notion of its being inhabited by devils, who torment the spirits of the damned in the bowels of this volcano. Authors are not agreed as to its dimensions, or its height above the surface of the sea. The accounts given of the phenomena which have accompanied its eruptions, by sir William Hamilton and Mr. Brydone, are exceedingly interesting. According to the observations of the last mentioned traveller, the height of *Ætna* is about 12,000 feet. Faujas de S. Fond states it at 10,036 feet. The circumference of the base is commonly reckoned about 180 miles. There are 77 cities, towns, and villages, scattered over different parts of the sides of this mountain, and the number of its human inhabitants above is 100,000. The distance from Catania to the summit exceeds 30 miles. The fire which is continually burning in the bowels of this mountain, led the poets to place here the forges of the cyclops, under the direction of Vulcan, and the prison of the giants who rebelled against Jupiter. The eruptions of this mountain have likewise been described by several of the ancient poets.

Attraction, in natural philosophy, 1. The tendency which the particles of matter have to be attracted or united to each other. 2. Elective attraction simple, reciprocal, or double. 3. Sympathy or consent of parts. The power by which one organ is affected by another, whether directly or inversely.

AFRICA, one of the quarters of the globe: commencing, northward, at the opposite coast of the strait of Gibraltar; extending along the whole

western side of the Mediterranean Sea ; divided from Asia by the Red ; extending into the Indian ; and forming the eastern boundary of the Atlantic, from the Cape of Good Hope, to the strait whence its limits have been traced. The principal rivers of Africa are the Niger, the Senegal, the Gambia, the Laira, the Coanza and the Nile : the principal mountains are the Atlas, the Mountains of the Moon, and the Sierra Leona. Africa produces lions, leopards, tigers, panthers, rhinoceroses, elephants, cameleons, ostriches, camels, monkeys, &c. and in the rivers there are crocodiles and river-horses.

AFRICAN COMPANY, a society of merchants established by Charles II. for trading to Africa. This commerce is now laid open to all the subjects of the realm, paying 10 *per cent.* for the maintenance of the forts.

AFTERSWATH, or *Aftersward*, in husbandry, the grass which grows up after mowing : it is called in some counties ROWEN.

AGA, in the Mogul language, a great lord or commander ; in the Turkish, it is applied in courtesy, to a gentleman or wealthy landholder ; or on account of post or rank, as to the commander in chief of the janissaries. The title Aga is known in other Mahometan countries. The chief officers under the khan of Tartary are called by this name ; and among the Algerines we read of *agas* chosen from among the *boluk bashi* (the first rank of military officers) and sent as governors in chief of towns and garrisons. The *aga* of Algiers is the president of the divan or senate.

AGATE, a precious stone, which naturalists have ranked among the semi-transparent precious

stones. Agates are distinguished, with reference to their degrees of transparency, into two kinds, and called *oriental* and *occidental*: the first generally comes from the eastern parts of the world, as its name implies; and the second is found in the western, as Germany, Bohemia, and other countries. The oriental agate is known by its clearness, transparency, and the beautiful polish of which it is susceptible: the occidental, on the other hand, is obscure, its transparency cloudy, and its polish much inferior to that of the former. All agates from the east have not, however, the perfections for which this class are celebrated; and some occidental are occasionally found that may be compared to the oriental without disadvantage. It is more difficult to distinguish the agate from other demitransparent stones, such as the chalcedonix and the sardonix, than to recognize it among stones entirely opaque. Owing to this variety, and this affinity to other stones, which are its characteristics, the agate has been divided into several kinds. The agate, simply so called, is of one colour, or more, clouding, like the veins in marble, into irregular forms, placed without order, and confounded with one another. The tints and shades of these colours vary almost to infinity, and, in their mixture, present curious, and sometimes very singular, shapes. Banks, rivulets, and trees, and often animals and human figures, are to be distinguished; and, with a little assistance from the imagination, complete pictures are perceived.

AGE, signifies 1. Any period of time attributed to something, as the whole, or part of its duration. 2. A succession or generation of men. 3. The

time in which any particular man, or race of men, lived. 4. In a man, the age of 14 years, is the age of discretion; and 21 years is the full age. A woman at 21 is able to alienate her lands. By the Roman law different ages were ascertained for different purposes. Thus the consular age, or that at which a person might hold the consulship, was the 43rd year. The judiciary age, between the 30th and 60th year. The military age, 17 years. The prætorian age, 40 years. The legitimate age, 25 years.

Age. Among ancient physiologists, the life or age of man was divided into six stages; pueritia, or childhood extending from birth, to the year five: adolescentia, or boyhood, to the year 18: juvenus, or youth, to the year 30: virilis ætas, manhood, to 50: senectus, old age, to 60: crepita ætas, decrepitude, to death.

AGIO, in commerce, a term chiefly used in Holland and at Venice, to signify the difference between the value of bank stock and the current coin. See EXCHANGE.

AGRARIAN LAWS, or statutes, which forbid the possession of more than a certain extent of land by any single individual. That law of the Romans, called, by way of eminence, *the agrarian law*, was published by Spurius Cassius, about the year of Rome, 268, enjoining a division of the conquered lands, in equal parts, among the citizens, and limiting the number of acres that each might enjoy. Mr. Harrington, in his *Oceana*, has discussed the policy of agrarian laws.

AGRICULTURE, the cultivation of the fields. In the theoretical study of agriculture, the first things

to be known are the food of plants, the nature of vegetable mould, and the different kinds of manure by which different soils may be fertilized. The next object of attention are the vegetables proper to be raised with a view to the melioration of the soil, or, for the rearing of cattle; and to these is to be added, an acquaintance with the diseases of plants. In practical agriculture, are to be considered the instruments of husbandry; the preparation of land for cropping; preparing, or bringing into culture, native soils; clearing ground of weeds; the character of the soil, and crop to which it is best adapted; the management of cattle; and the modes of cultivating the several sorts of grain and other vegetables.

AID-DE-CAMP, in military affairs, an officer employed to receive and carry the orders of a general. In the old military establishment of France, this name was applied to young volunteers, who attached themselves to general officers, to carry their orders wherever necessary, and principally during battle. The merit of an aid-de-camp consists in apprehending, with the utmost clearness, the orders he receives, and delivering them with perfect exactness and precision.

AIR, in natural philosophy and chemistry, a general term used to denote such invisible and exceedingly rare fluids as possess a very high degree of elasticity, and are not condensable into a visible fluid state by any degree of cold we are acquainted with. By this last circumstance air is distinguished from vapour, which is condensable by cold. This term was originally, and for a long time peculiarly, applied to the air of which the at-

mosphere is composed ; and in this sense we shall here consider it. The different kinds of air, now comprehended under the general term gas, which the researches of chemistry have discovered, will be mentioned hereafter. See GAS, CHEMISTRY, and PNEUMATICS.

AIR, in the elegant fables of the Greeks, was personified under the names of Jupiter and Juno. Jupiter was said to reign in the upper atmosphere, and Juno in the lower. The air is sometimes, also, represented as a divinity, whose wife is the moon, and whose daughter the dew.

AIR, MANNERS. The air seems to be born with us ; it strikes at first sight : *manners* are the result of education. A man pleases by his air ; he distinguishes himself by his manners. The air prejudices ; the manners engage. Such a one displeases and repulses you by his manners. He gives himself an air ; he affects manners ; he composes his air ; he studies his manners.

AIR, in music, is properly the tune which is adapted to the words of a song, or little piece of poetry intended to be sung ; and, by the extension of the term, the song itself is called an *air*. In operas, the name of *air* is given to all measured music, to distinguish it from the recitative ; and, generally, to every piece of music, whether vocal or instrumental, which has its beginning and end. If the subject is divided into two parts, it is called a *duo* ; if into three, a *trio* ; if into four a *quartetto*, &c.

AIR-BALLOONS, a general name given to bags formed of a light substance, and filled with inflammable air. See AEROSTATION.

AIR-BATH. The use of the air-bath, that is, the act of plunging, as it were, from a warm bed into a cold room, and, after some time, returning into bed again, has been strongly recommended, by example, from Dr. Franklin and Lord Monboddo. "Every morning," says Dr. Franklin, "at day-break, I get out of bed, and pass half an hour or an hour in my chamber, according to the season, in writing or reading, without my clothes; and this seems rather pleasant than otherwise; and if I return to bed, as is sometimes the case, before I dress myself, I have an addition to my night's rest of one or two hours sleep, sweeter than you can imagine." Lord Monboddo, whose great age, mental serenity, and bodily energy, are well known, was in the habit of springing from his bed in the morning, and walking briskly up and down a cold, adjoining room. The air-bath, a contrivance "for the reception of fresh air," is recommended by Dr. Willich, "to all persons, but especially children," whom, he says, ought to resort, at least for a short time, *every day*, to this method of enjoying the salubrious influence of that universal agent.

AIR BLADDER, a kind of vesicula found in the bodies of fish, and denominated "the Sound," by means whereof they are enabled to sustain themselves in any depth of water, and either to rise or sink at pleasure. The air-bladder is the same with what is otherwise called the swimming-bladder; it lies close to the back-bone; and has a pretty strong muscular coat, whereby it can contract itself. By contracting this bag, and condensing the air within it, fish can make their bodies specifically heavier.

than water, and so readily fall to the bottom; whereas the muscular fibres ceasing to act, the air is again dilated, and they become specifically lighter than water, and so swim above. According to the different degrees of contraction and dilatation of this bladder, they can keep higher or lower in the water at pleasure.

AIR-GUN, a machine, the general form of which resembles a musquet, and so contrived, that bullets are exploded from it, with great violence, by means of air. The force of air, however, is not so great as that of gunpowder. See **PNEUMATICS**.

AIR-JACKET, a sort of jacket made of leather, in which are several bags or bladders, containing air. By the help of these bladders, which are placed near the breast, a person is supported in the water, without making the efforts used in swimming.

AIR-PIPES, an invention for drawing foul air out of ships, or any other close places, by means of fire.

AIR-PUMP. The name of this machine is sufficiently explanatory of its object. It is used in **PNEUMATICS**, which see; and by means of it, a vessel adapted to the experiment may be entirely exhausted of air.

AIR-SHAFTS, among miners, denote holes or shafts let down from the open air to meet the *adits*, or shafts of entrance, and furnish fresh air.

AIR-THREADS, in natural history, the long filaments seen floating in the air at the autumnal season of the year. These threads are the work of spiders, especially of that species called the long-legged field-spider. This animal, having gained the summit of a bush or tree, darts from its tail

several of these threads, till one is produced capable of supporting it in the air: and this it mounts in quest of prey, and frequently rises to a very considerable height.

AIR-VESSELS, ducts in the leaves and other parts of plants, supposed to convey air to the vegetable system, as the lungs do to the animal.

AJUTAGE, or **ADJUTAGE**, in hydraulics, part of the apparatus of a jet d'eau, or artificial fountain; being a kind of tube fitted to the aperture or mouth of the cistern, or the pipe; through which the water is to be played in any direction, and in any shape or figure.

It is chiefly the diversity in the ajutage, that makes the different kinds of fountains. So that, by having several ajutages, to be applied occasionally, one fountain is made to have the effect of many.

It has been found that jets do not rise quite so high as the head of water; owing chiefly to the resistance of the air against it, and the pressure of the upper parts of the jet upon the lower: and for this reason it is, that if the direction of the ajutage be turned a very little from the perpendicular, it is found to spout rather higher than when the jet is exactly upright. It is found by experiment too, that the jet is higher or lower, according to the size of the ajutage: that a circular hole of about an inch and a quarter in diameter, jets highest; and that the farther from that size the worse. Experience also shews that the pipe leading to the ajutage should be much larger than it; and if the pipe be a long one, that it should be wider the farther it is from the ajutage.

ALABASTER, a stone whose basis is calcareous,

earth. Its fineness and transparency renders it in some measure transparent. There is a church at Florence illuminated by alabaster windows: instead of panes of glass, it has slabs of alabaster, nearly fifteen feet high, each of which forms a single window. In the German province of Hohenstein, a kind of laminated alabaster is found in great abundance, beautifully variegated with the figures of trees, shrubs, and sprays.

ALARUM, any contrivance for the purpose of alarm. A bell, or rattle, to call assistance. A bell fastened to, or communicating with, a door or window. A piece of mechanism is sometimes affixed to clocks, by means of which a noise is made at any required time. At the royal observatory, at Greenwich, the deputy astronomer is by this means roused at all hours of the night; to make the necessary observations; and the same method is resorted to by persons desirous of rising at unusual times. The slug-a-bed (or *lig-a-bed*), however, can easily render the alarm of no avail. A fellow of one of the colleges of Oxford, desirous of overcoming his indolence, had procured an alarm. It was a weight, that at a given hour, descended with rapidity from a clock in his chamber. The alarm descended, and the ly-a-bed awoke; but still he rose no earlier than before. In this dilemma, by an addition of his own, he rendered the alarm complete. He had a china bowl, the gift of a friend whom he highly valued: this he placed under the alarm; and now he was obliged to spring up at the instant of summons, lest the weight should demolish his relic.

ALBINO, the name given by the Portuguese to a

white Moor; that is, one who is afflicted with the *nyctalopy*. The term is sometimes applied to such Europeans, as have the same constitutional imperfections. See *Nyctalopy*.

ALBUMEN, in its primitive sense, signifies the white of an egg; but it is now applied to one of the constituent parts of vegetable bodies, exactly resembling this animal substance.

ALBURNUM denotes the white soft substance that lies between the inner bark and the wood of trees, composed of layers of the former, which have not attained the solidity of the latter. A new layer of alburnum is added annually to the tree in every part, just under the bark, and the former layer of alburnum becomes perfect wood.

ALCHEMY, or *Alchemy*, is properly applied to the higher pursuits of chemistry, as *The chemistry*, by way of eminence; but the name has become obsolete on account of two objects, which speculators hoped for, and impostors, by its means, pretended to have acquired. These were, 1. The philosopher's stone, by which all metals might be transmuted into gold; and, 2. A potion, called the *elixir of life*, with which youth might always be renewed.

ALCOHOL, an Arabian word, signifying any thing reduced into extremely thin parts, or rendered extremely subtle by distillation. The word, at present, is used for a highly rectified spirit. This preparation is extremely light and inflammable: it is colourless and transparent, appearing to the eye like pure water. To the taste it is exceedingly hot and burning: but without any peculiar taste. From its lightness, the bubbles which are

formed by shaking, subside almost instantaneously which is one method of judging of its purity. Alcohol boils at 165° : but it cannot be frozen or converted from the fluid to the solid form, and on this account, it has been much used in the construction of thermometers. It is employed as a solvent for resinous gums, which form the basis of varnishes. Its antiseptic power renders it valuable in preserving animal substances.

ALCORAN. See *Koran*.

ALDERMAN, among our Saxon ancestors, was a degree of nobility, from which is derived the *earl* of the present day. Modern aldermen form the principal branch of a town or city corporation. Their number is not limited, but differs according to the magnitude of the place, where they exercise the authority of commissioners of the peace. In London, their number is twenty-six; each having a ward, or district of the city committed to his more peculiar care; but, serving by rotation, as sitting magistrate for the whole. The office is for life, or for so long as the individual chooses to retain it. When a vacancy happens, through death or resignation, the livery of the ward are assembled, or, to use the peculiar term, a *ward-mote* is held; a new alderman is chosen, whom the lord mayor returns to the other aldermen, in the court of the lord mayor and aldermen, where the person so returned must be admitted, and sworn into the office, before he can act. If the person elected refuses to wear the gown, he is liable to a fine of 500*l*. Aldermen are exempted from inferior offices; from being put upon assizes; or from serving on juries. In the present day persons are not

fined for refusing to take the gown ; the honour is an object of great and anxious contest : but owing, it is supposed, to some recent failures in the city of London, it has been determined that no person shall be admitted to take the gown who cannot swear that he has property equal to 30,000*l*.

ALECTOROMANTIA. An ancient kind of divination by means of a cock, called also *Alectryomancy* ; of which there appear to have been different species. But that most spoken of by authors was in the following manner : A circle being described on the ground, and divided into 24 equal portions, in each of these spaces was written one of the letters of the alphabet, and on each of the letters was laid a grain of wheat ; after which a cock being turned loose in the circle, particular notice was taken of the grains picked up by the cock, because the letters under them, being formed into a word, made the answer desired. It was thus, according to Zonaras, that Libanius and Jamblicus sought who should succeed the emperor Valens ; and the cock eating the grains answering to the spaces $\Theta\text{E}\Omega\Delta$, several whose names began with those letters, as Theodotus, Theodistes, Theodulus, &c. were put to death, which did not hinder, but promote, Theodosius coming to the succession.

ALEMBIC. One of the simplest and most ancient vessels employed in distillation. It is not at present much used in England ; the retort and still having been adopted in its stead ; but in France and many parts of the continent, it continues to be the favourite vessel for distillations in the large way. The most frequent use of alembics is for distillations of very volatile principles drawn from several sub-

stances, particularly from vegetables. When the principles intended to be procured by distillation are such as do not act upon metals, and when they will rise with a degree of heat equal to, or very little exceeding, the heat of boiling water, copper alembics are employed, having their internal surfaces well tinned ; but when acid and saline substances, which attack metals, are to be distilled, it is necessary to make use of glass alembics.

ALEXANDRIAN LIBRARY. This famous library was founded by Ptolemy Soter, for the use of an academy that he instituted in Alexandria ; and, by continual additions by his successors, became at last the finest library in the world, containing no fewer than 700,000 volumes. The method followed in collecting books for this library, was, to seize all those which were brought into Egypt by Greeks or other foreigners. The books were transcribed in the museum by persons appointed for that purpose ; the copies were then delivered to the proprietors, and the originals laid up in the library.

Alexandrian Manuscript, a famous copy of the Scriptures, consisting of four volumes, in a large quarto size ; which contains the whole bible, in Greek, including the Old and New Testament, with the Apocrypha, and some smaller pieces, but not quite complete. This manuscript is now preserved in the British Museum. It was sent as a present to king Charles I, from Cyrillus Lucaris, patriarch of Constantinople, by sir Thomas Rowe, ambassador from England to the grand signior, about the year 1628. Cyrillus brought it with him from Alexandria, where probably it was written. In a schedule annexed to it, he gives this

account; that it was written, as tradition informs them, by Thecla, a noble Egyptian Lady, about thirteen hundred years ago, not long after the council of Nice.

ALGÆ, in botany, an order of the cryptogamia class of plants. It is one of the seven families or natural tribes into which the vegetable kingdom is distributed. The plants belonging to this order have their root, leaf; and stem entire. Sea-weeds and other aquatic plants are comprehended under this division.

ALGEBRA is a method of performing the calculation of all sorts of quantities by means of general signs or characters. At first numbers and things were expressed by their names at full length, but afterwards these were abridged, and the initials of words were used in their stead: then the letters of the alphabet came to be employed as general representatives of any kinds of quantity. Hence algebra has been called "Specious Arithmetic," on account of the species of letters of the alphabet used: it is also called "Universal Arithmetic" from the manner in which it performs all arithmetical operations by general signs. All figures or arithmetical characters as 5, 7, 9, &c. have a determinate value, and always represent the same numbers, but algebraical characters are general and independent of any particular signification. The value of some quantities, in this science, are assumed as known, and others are supposed to be unknown. The known quantities are usually represented by the early letters in the alphabet, and the unknown ones by the final letters. Thus *a*, *b*, *c*, &c. are commonly put for known quantities, and *x*,

y, x , &c. for unknown or indeterminate quantities: thus if $a + x$ be equal 9 and a is known to be equal to 4, then $x = 9 - 4 = 5$. Again if $a + x = 12$, and $a - x = 8$, then by adding the two quantities together I get $2a = 20$ (because there being $+x$ and $-x$ they destroy one another) and $a = \frac{20}{2} = 10$, of course $x = 2$. On such operations as these, extended almost indefinitely, algebra depends, and by them every problem in arithmetic, and almost all in geometry may be solved.

ALGOL, the fixed star in Caput Medusæ, and marked β in Perseus. This star is subject to periodic variations in its brightness. It changes from the second magnitude to the fourth in about three hours and a half, and back again in the same time; when it continues of the greatest brightness for about two days and seven hours, then it changes again.

ALGUAZIL, in Spain, is the title of one of the lower orders of officers of justice. His business is to execute the orders of the magistraté. An alguazil is nearly the same officer as one whom, in some parts of our civil polity, we call a serjeant: as a serjeant-at-mace.

ALIENATION, in law, the act of making a thing another man's: or the altering and transferring the property and possession of lands, tenements, or other things, from one man to another. To alienate, or alien, in mortmain, is to make over lands or tenements to a religious community, or other body politic. To alienate in fee, is to sell the fee-simple of any land, or other incorporeal right. All persons who have a right to lands, may generally alien them to others; but some alienations

are prohibited: such as alienations by tenant for life, &c. whereby they incur a forfeiture of their estate.

ALIBI, *elsewhere*, a latin word, used, in criminal proceedings, to signify the absence of the accused with respect to the *place* where he is charged with having committed an offence:—thus, to alledge and prove an *alibi*, is to protest and establish, by good testimony, that when the crime was committed, the party accused was in a different place from that in which it is said to have happened.

ALIEN, in law, implies a person born in another country.

ALIMENT, the nourishment which food affords. Animal food contains the greatest proportion of aliment; but, as a redundance of aliment is not less injurious than the contrary extreme, it is not proper that the stomach should be wholly filled with what is highly alimentary; for this reason, vegetables ought to be consumed in a greater quantity than flesh. Arrow-root, rice, sago, salep-powder, and tapioca, are said to contain an uncommon quantity of aliment, and are therefore recommended to the infirm.

ALIQUNT PART, in arithmetic, is that number which cannot measure any other exactly without some remainder. Thus, 7 is an aliquant part of 16; for twice 7 wants 2 of 16, and 3 times 7 exceeds 16 by 5.

ALIQOT PART, is that part of a number or quantity which will exactly measure it without any remainder. Thus, 2 is an aliquot part of 4; 3 of 9; 4 of 16, &c. All the aliquot parts of any number may be thus found: divide the given number

by its least divisor, then divide the quotient also by its least divisor; and so on, always dividing the last quotient by its least divisor, till the quotient 1 is obtained; and all the divisors, thus taken, are the prime aliquot parts of the given number.

ALKALI, a general term for an order of salts of great use and importance. There are two kinds of alkalies; the fixed, which have no smell, and the volatile, which have a pungent one: of the former kind there are two, potass, potash, or the vegetable fixed alkali; and soda, or the mineral fixed alkali; of the latter there is but one species, which is called ammonia.

The general properties of alkalies, which are common to them all, are the following: 1. A peculiar acrid taste, which acts with so much energy as to corrode the tongue. 2. The power of changing the blue colours of vegetables green: from this, however, there are deviations; for they change the red of archil or litmus to a blue, and the yellow of turmeric, as well as the light brown of many roots and woods, to a dull red. 3. They are highly soluble in water, giving out heat on their union. 4. They corrode woollen cloth, and if strong, reduce it to the form of a jelly. 5. They render oils miscible with water, by uniting with them, and forming with them the well-known compound, soap. 6. Combined with sulphur, they form alkaline hepars, or livers, now called alkaline sulphurets. 7. With the acids they form neutral salts, of different degrees of solubility; these are distinguished by different names, according to the acid and the alkali employed; thus, a salt formed by the union of sulphuric acid with potash, is called

sulphat of potash ; that composed of nitric acid and soda, is called nitrate of soda ; and so on.

The fixed alkalies are so called, because they are not volatilized without an intense heat: they melt, however, with a moderate degree of heat, and, uniting with earthly substances, form glass. They will also dissolve by heat all the metallic oxyds, and assist in the effusion of all earthly and metallic mixtures. When pure and solid, they are remarkably deliquescent, absorbing water from the atmosphere or any surrounding medium ; so that they are sometimes used to render the air of vessels perfectly dry. Both the fixed alkalies, potash and soda, have these properties ; but with some variation, which can scarcely be observed when both are in a state of purity : it is only in their combinations that the difference of their natures can be distinguished. From these combinations, it appears that they differ from each other in the strength of their affinity with acids, which is greater in the former ; in a slight degree in their action on oils and animal fats ; but chiefly in the neutral salts which they produce with acids, which, in all cases differ in form of crystallization, in solubility, often in taste, and in several other particulars.

Potash is called the vegetable alkali, because it is procured from the ashes of all vegetables, in a greater or less proportion, except marine plants, and a few that grow near the sea-shore, which yield soda. This latter is termed the mineral alkali, because it is not only obtained from the ashes of the last-mentioned plants, but is sometimes found native in the earth.

Ammونيا, or the volatile alkali, is procured by

decomposition, from all animal, and from some vegetable substances ; and by putrefaction from all these matters. It is distinguished from the fixed alkalies by its volatility, which is so great that it very easily assumes a gaseous form, and is dissipated by a very moderate degree of heat ; and by its pungent smell. Its purest form is that of a gas : it is never solid, unless combined with some other substances ; nor liquid but when it is united with water. It is weaker in all its affinities than the fixed alkalies ; and is composed of hydrogen and azote, in the proportion of 193 parts of the former to 807 of the latter.

Alkalies are either mild, or caustic. In the first state they are combined with fixed air, or carbonic acid gas, which moderates their action, and which occasions them to effervesce with acids—a character formerly thought to be essential to alkalies in general, but now known to depend upon the expulsion of the acid to which they are united. In their second or caustic state, the carbonic acid is separated from them by lime, which thus renders them more pure, and increases the energy of their action. All the mild or effervescent alkalies, then, in the new nomenclature, are really carbonates of potash, soda, or ammonia : and the caustic alkalies are the only ones that exist in a state of purity. See *Potash, Soda, &c.*

Alkaline Earths, are those which partake, of the nature both of earths and alkalies ; or, in other words, those earths which agree with alkalies in being soluble in water, to a certain extent, and thereby rendering it sapid, in the property of changing to green, certain blue, and red vegetable

colours ; of absorbing carbonic acid with eagerness ; and of possessing, when pure, those caustic or acrid qualities that so much distinguish the alkalis. These earths are barytes, magnesia, lime, and strontian ; whose saline properties generally predominate over their earthy ones.

ALLEGIANCE, the fidelity due to the king as a temporal prince and sovereign. The oath of allegiance acknowledges this part of his character, while that of supremacy regards him as the head of the English church.

ALLEGORY, a figure of rhetoric, in which, terms are employed that, taken in their literal sense, signify something very different from what is intended, but which bears an allegorical resemblance. The allegory is a continued simile ; it is a picture that is intended to attract by the objects it presents, and instruct by its obvious meaning. Allegory is fable. Thus, orators and poets have represented a state under the figure of a vessel, and the troubles that agitate it under those of unruly winds and waves ; by pilots they mean sovereigns and magistrates : and by a haven, peace or concord.

ALLEGRO, in musical composition, points out the third of the four principal degrees of time, as established in Italian music. *Allegro* is an Italian adjective, signifying gay, and also expressing a gay and animated movement.

ALLIGATION, a rule of arithmetic, which resolves questions that relate to the compounding or mixing together divers simples or ingredients. There are two kinds of alligation, medial and alternate. The former is the method of finding the rate or quality of the composition, from having the given rates and

quantities of the ingredients. The *latter* is the method of finding the quantities of ingredients necessary to form a compound of a given rate.

Example in alligation medial : If 6 pounds of tea worth 5s. per lb., and 8 lb. worth 6s. per lb. be mixed; to find the value of 1 lb. of the mixture.

Rule. Multiply each quantity by its rate and add all the products together, then divide the sum of the products, by the sum of the quantities, and the quotient will be the rate sought.

Thus in the example,

lb.	s.	
6	× 5 = 30	
8	6 = 48	
<hr style="width: 50px; margin: 0;"/>	14	78.

and 14) 78 (5s. 6d $\frac{1}{4}$ Answer.
70
—
8, &c.

Ex. in alligation alternate : Teas at 9s. and 6s. per lb. to find the proportions, so as to sell a mixture of the two kinds at 7 shillings per lb.

Rule. Set down the prices and find the difference between each of them, and the proposed price, which set down in alternate order, and they will shew the proportions : thus

Tea . . . 9	} 7	{	1	}	2	}	Therefore a mixture of one
Tea . . . 6							

of that at 6s. is the answer.

ALLITERATION, a figure in poetry, which consists in the repetition of the same letter. Tastefully used, it is a most enchanting ornament. It will equally contribute to softness, to energy, and to solemnity. The reason of this effect, and of its adversity is,

that each letter of the alphabet has a peculiar character : thus the *r* will generally be found to begin words that imply *violence*; or, by metaphor, something that does violence to the imagination : as *rend*, *roar*, *rugged*; the *s*, such as have a reference to quiet : as *still*, *stand*, *stone*. The following examples will explain what is called alliteration, and show, so far as they go, its influence on the expression :

“ *Fields ever fresh, and groves for ever green.*”

“ *Ruin seize thee, ruthless king.*”

“ *To high-born Hoel's harp, or soft Llewellyn's lay.*

“ *Stamp we our vengeance deep, and gratify his doom.*”

ALLODIAL *lands*, are those which, under the feudal system, were free. Their owners owed no service to a superior lord.

ALLOY, or *Allay*, a proportion of a baser metal, mixed with a finer one. Silver and gold are alloyed, in order to render them of such a degree of hardness, free from brittleness, as will fit them for use. The principal reasons alledged for alloying national coin are these : 1. The natural mixture of metals, which, when melted from the mine, are not perfectly pure. 2. The saving the expence that must ensue if they were to be refined. 3. The necessity of rendering them hard, by mixing some parts of other metals with them to prevent the diminution of weight in passing from hand to hand. 4. The melting of foreign gold or coin, that is alloyed. 5. The charges of coinage, which must be made good by the profit arising from the money coined. 6.

The duty belonging to the sovereign, on account of the power he has of causing money to be coined in his dominions. Many alloys of metals are used in our manufactures, of these the most useful are brass, type-metal, tutenag, bronze and speculum metal. When two metals are fused together and produce a mass whose specific gravity is greater or less than the mean specific gravity of its elements, the result is an alloy, or proper chemical combination. Combinations of this kind are more fusible than the metals of which they are formed. Thus an alloy of tin, bismuth, and lead, in certain proportions will melt in boiling water, which is a less heat than is necessary for the liquefaction of bismuth, the most fusible of the three.

ALLSPICE, so called from its flavour, which unites that of the cinnamon, of the nutmeg, and of the clove, is the pimento, or, Jamaica-pepper. It is, to most persons, an agreeable spice; and, in medicine, it is used as an aromatic.

ALLUVIAL, this is a term used by mineralogical and geological writers, and by alluvial depositions is meant the soil which has been formed by the destruction of mountains, and the washing down of their particles by torrents of water. The alluvial formations constitute the great mass of the earth's surface. They have been formed by the gradual action of water upon other formations. See Mineralogy.

ALMAGEST, the name of a celebrated book, composed by Ptolemy; being a collection of many of the observations and problems of the ancients, relating both to geometry and astronomy. The Arabic word is *almaghesti*. Ptolemy was born about

the year of Christ 69, and died in 147, and wrote this work, consisting of 13 books, at Alexandria in Egypt, where the Arabians found it on the capture of that kingdom. It was by them translated out of Greek, into Arabic, by order of the caliph Almaimon, about the year 827, and first into Latin about 1230, by favour of the emperor Frederic II. The Greek text however was not known in Europe till about the beginning of the 15th century, when it was brought from Constantinople, then taken by the Turks, by George a monk of Trabezond, who translated it into Latin, which translation has several times been published.

ALMANAC, an astronomical table of the days of the year, with the addition of various civil particulars. The name and plan of this yearly work, and particularly the astrological part, which still disgraces a very popular almanac of our own age, is borrowed from the Arabs: but Regiomontanus, or, John Muller, of Montereio, who flourished at Nürnberg, in the latter part of the fifteenth century, was the first that reduced it into the present method. His first almanac was published in 1474.

Nautical Almanac, and *Astronomical Ephemeris*, a kind of national almanac, published by anticipation for several years beforehand, for the convenience of ships going out upon long voyages; it is adapted to the first meridian, and contains, besides many particulars common to other almanacs, the sun's longitude, right ascension, declination: the planet's longitudes, latitudes, times of passing the meridian; the times of solar and lunar eclipses, together with those of Jupiter's satellites; the distances of the moon from the sun, and certain fixed

stars; and, in general, the times when any remarkable celestial appearances may be seen at the place for which the ephemeris is calculated.

ALMONER, originally denoted an officer in religious houses, to whom belonged the management and distribution of the alms of the house. By the ancient canons, all monasteries were to spend a tenth part, at least, of their income in alms to the poor. The almoner of the cathedral church of St. Paul's, in London, is to dispose of the monies left for charity, bury the poor who die in the neighbourhood, and breed up eight boys to singing, for the use of the choir. All bishops are likewise, by ancient canon, enjoined to keep almoners.

Almoner, Lord, or Lord High-Almoner of England, is an ecclesiastical officer, generally a bishop, who has the forfeiture of all deodands and goods of suicides, which he is to distribute among the poor. He has, also by virtue of ancient custom, the power of giving the first dish from the king's table to whatever poor person he thinks proper.

ALMS, a general term for what is given out of charity to the poor. Anciently, the ecclesiastics subsisted wholly on alms, which were thus divided: one part was allotted to the bishop, another to the priests, and a third to the deacons and subdeacons, which made their whole subsistence; the fourth part was employed in relieving the poor, and in repairing the churches.

ALMUCANTERS, are circles of the sphere passing through the centre of the sun, or a star parallel to the horizon, being in fact the same as parallels of altitude. They are the same with respect to the azimuths and the horizon, that parallels of latitude are with regard to the meridians and equator.

ALPHABET, the natural or customary series of the several letters of a language. The word is formed from alpha and beta, the first and second letters of the Greek alphabet. The number of letters is different in the alphabets of different languages. The English alphabet contains 24 letters ; to which if we add j and v consonant, the sum will be 26 : the French contains 23 ; the Hebrew, Chaldee, Syriac, and Samaritan, 22 each ; The Arabic 28 ; the Persian 31 ; the Turkish 33 ; the Georgian 36 ; the Coptic 32 ; the Muscovite 43 ; the Greek 24 ; the Latin 22 ; the Slavonic 27 ; the Dutch 26 ; the Spanish 27 ; the Italian 20 ; the Shanscrit 50 ; the Ethiopic and Tartarian, each 202 ; the Indians of Bengal 21 ; the Baramese 19. The Chinese have, properly speaking, no alphabet, except we call their whole language by that name ; their letters are words, or rather hieroglyphics, amounting to about 80,000.

ALPS, a range of high mountains, separating Italy from Gaul and Germany, in the form of a crescent. They take their rise from the Vada Sabatia, or Savona ; and reach to the Linus Fluvaticus (now Golfo di Carnaro of the Adriatic), and the springs of the river Colapis, (now the Kulpe) ; extending, according to Livy, 2,000 stadia in length, or 250 miles ; they are divided into several parts, and accordingly have different names. From Savona to the springs of the Varus, where the Alps lie against the sea of Genoa, they are called Maritime, now le Montagne di Tenda. These extend from south to north, between Gaul to the west and Genoa to the east, beginning at Monaco on the Mediterranean ; then running out through the east of the County of Nice, and between that and the

marquisate of Saluzzo, terminate at length at mount Viso, between Dauphiné and Piedmont.

The Alps are the highest mountains in Europe ; being, according to some geometricians, about two miles in perpendicular height. They begin at the Mediterranean, and, stretching northward, separate Piedmont and Savoy from the adjacent countries ; whence directing their course to the east, they form the boundary between Switzerland and Italy, and terminate near the extremity of the Adriatic Sea, north-east of Venice. It was over the western part of those mountains, towards Piedmont, that Hannibal forced his passage into Italy.

ALTERNATION, or *Permutation*, of quantities or things, is the varying the order or position of them,

Thus two things, or quantities, a and b, may either of them stand first, as a b, or b a, making $1 \times 2 = 2$, alternations. A third thing may stand three different ways relatively to either of the positions a b, or b a, of the other two ; for it may stand either before, or between, or after them, thus making $1 \times 2 \times 3 = 6$, the changes of three things. In like manner, it will appear that with four things there may be four times as many changes as with three, making $1 \times 2 \times 3 \times 4 = 24$. And so on, always multiplying the last found number of alternations, by the ordinal number of the next thing added. For example, the number of changes which may be rung on twelve bells, will be expressed by the product of $1 \times 2 \times 3 \times 4 \times 5 \times 6 \times 7 \times 8 \times 9 \times 10 \times 11 \times 12 = 479,001,600$.

ALTITUDE, in geometry, is the third dimension of body, considered with respect to its elevation above the ground ; and is otherwise called its height or

depth; the former, when measured from bottom to top, the latter when measured from top to bottom.

Altitude of a figure, is the distance of its vertex from the base, or the length of a perpendicular let fall from its vertex to the base. The altitudes of figures are useful in computing their areas or solidities.

Altitude or height of any point of a terrestrial object, is the perpendicular let fall from that point to the plane of the horizon. Altitudes are distinguished into accessible and inaccessible.

Altitude, Accessible, of an object, is that to whose base there is access, to measure the nearest distance to it on the ground, from any place.

Altitude, Inaccessible, of an object, is that to whose base there is not free access, by which a distance may be measured to it, by reason of some impediment, such as water, wood, or the like.

To measure or take Altitudes. If an altitude cannot be measured by stretching a string from top to bottom, which is the direct and most accurate way, then some indirect way is used, by actually measuring some other line or distance which may serve as a basis, in conjunction with some angles, or other proportional lines, either to compute, or geometrically determine, the altitude of the object sought.

There are various ways of measuring altitudes, or depths, by means of different instruments, and by shadows or reflected images, on optical principles. There are also various ways of computing the altitude in numbers, from the measurements taken as above, either by geometrical construction, or trigonometrical calculation, or by simple numeral computation from the property of parallel lines, &c.

The instruments mostly used in measuring altitudes, are the quadrant, theodolite, geometrical square, line of shadows, &c.

ALUM, a fossil, salt, and mineral, of an acid taste, which leaves in the mouth a sweetness, accompanied by an astringency so considerable as to cause a sensation of shuddering. There are two sorts of alum, the natural and the artificial. In a natural state, it is said to be met with in Egypt, Sardinia, Spain, Bohemia, and other places, and the counties of York and Lancaster, in England. On account of its astringent qualities, it is used in several mechanic arts, and in medicine. In dying, it fixes and brightens colours; it constitutes the basis of crayons; it gives hardness and consistence to tallow, in the manufacture of candles; and wood, soaked in a solution of alum, being incapable of taking fire, and answering the purpose, also, of excluding the air, is used for powder magazines.

AMALGAM, in chemistry and the arts, a mixture or alloy of any of the other metals with mercury.

As mercury is habitually fluid in the common temperature, and as it is sufficient for most combinations that one of the bodies be fluid, it follows that without the help of heat, mercury may be amalgamated with many of the metals. Hence there are two methods generally used in the making of amalgams. The first is merely by trituration in a mortar, and without heat: the second is by fusing the metal which is to be amalgamated, and by adding to it, when fused, the intended quantity of mercury.

Amalgams are more or less soft according to the proportion of mercury employed: if this be small

they become solid, but brittle, and capable of being pulverised; if it be more considerable, a kind of paste is formed which has no ductility or tenacity; and if the proportion of mercury is very great, the amalgam is only distinguished from that substance by an appearance of foulness.

Amalgam of Tin, is prepared in the same manner as that of lead, by pouring heated mercury into melted tin-foil. This is much used for tinning mirrors, and enabling them to represent images more sensibly and perfectly. It was formerly employed in the preparation of mercury-balls for purifying water; these were composed of four parts of tin and one of mercury, and were suspended in water, which was at the same time boiled, to purify it from extraneous matter. Mr. Canton observed that a small quantity of this amalgam, with a very little chalk or whiting, being rubbed on the cushion of an electrical machine, contributed very much to increase the power of electricity. The amalgam of zinc is now preferred for this use.

AMBASSADOR, or *Embassador*, a representative sent by one nation to another. Embassadors are ordinary or extraordinary. An ordinary ambassador is one who resides at the court or seat of government of a foreign power, as an officer of state, to maintain a mutual good understanding, to be watchful of the interest of his own nation, and to negotiate the affairs that occur. This is a modern institution: two hundred and fifty years ago, all ambassadors were *extraordinary*, or such as were sent upon particular and pressing occasions. These latter are now generally called *envoys extraordinary*. Embassadors of kings are not to attend marriages or

burials, nor public or solemn assemblies, unless their masters have an interest in them. They are not to wear mourning, even for their own relations, because they represent the persons of their princes, and must resemble them in every thing. Their persons are sacred, both in peace and war : so that according to the law of nations, if hostilities break out between two nations, the respective ambassadors are permitted to depart without molestation ; and if, during the continuance of such hostilities, they are received into an enemy's country for the purpose of negotiation, they are to pass freely, and be treated with punctilious civility.

AMBER, appears to be a bitumen, of fossil origin. It is found in the earth, and on the sea shore. It abounds more particularly in Prussia, which, on this account, once obtained the name of Country of Amber. Several hypotheses have been set up, respecting the nature of amber. By some, it is supposed to be resinous gum, oozing from pines, and falling on the earth, or into the sea ; by others, a fossile formed in the earth, and washed ashore by the sea ; and, by Dr. Girtanner, an animal product, nearly resembling wax. He relates, that the old pine-forests are inhabited by a large species of ant which forms hills of about six feet in diameter, and that it is generally in these ancient forests, or in places where they have been, that fossile amber is found. This substance is not hard, like that taken up on the shores of Prussia : it has the consistence of honey, or of half-melted wax : but it is of a yellow colour, like common amber ; it gives the same produce by chemical analysis ; and it hardens, like the other, when it is suffered to remain for some

time in a solution of common salt. Insects are found in amber; among these, ants are always the most general; circumstances that undoubtedly support Dr. Girtanner's opinion. According to this gentleman, amber is nothing but a vegetable, rendered concrete by the acid of ants, as wax is an oil, hardened by the acid of bees. Pliney describes amber as oozing from certain trees of the fir kind, grown in the islands of the northern ocean: the liquor, he says, previously congealed by the cold, falls into the sea, and is carried by the waves to Prussia, the nearest continent. From the various accounts that are given, it is certain, that amber is found in great quantities beneath the earth, and picked up on the sea-shores, in many parts of the world. In England, it has been found in clay-pits, and on the coast.

Amber is of several colours: it is commonly yellow, varying from the lemon to the orange; in other instances, it is whitish, or somewhat inclining to brown. The yellow gold-coloured amber is so transparent, and so susceptible of the highest polish, that it has been ranked among precious stones, and is applied to various purposes of elegance. It is made into all sorts of trinkets: A French writer of the present age observes, that amber was once fashionable in France; and fell into obscurity when costly metals and jewels grew sufficiently common to be subservient to luxury: but the medicinal virtues of amber, he subjoins, have not suffered the same fate; these, says he, will render it, in all ages, more precious than the brightest gems. It is prepared in the several forms of a tincture, an oil, and a salt, and recommended as a cordial and nervous

medicine. It is a principal ingredient in the composition of all varnishes. As a cabinet curiosity, it is valuable on account of the insects, pieces of moss, &c. that are frequently found in it. The inclosure of these objects evidently proves that amber is originally in a soft state; at which time, insects, leaves, and other casual matters are liable to adhere.

This curious production of nature is inflammable, and, when heated, yields a strong and bituminous odour. Its most extraordinary properties are those of attracting, after it has been exposed to a slight friction, straws, and other surrounding objects; and of producing sparks of fire, visible in the dark. Many thousand years before the science of electricity had entered the mind of man, these surprising qualities were known to exist in amber, and hence the Greeks called it *electrum*. The Romans, supposing it to be a vegetable juice, named it *succinum*; by the Arabs it is denominated *ambra*, whence the French write it *ambre*, and the English, *amber*.

AMBERGRIS, *ambre-gris*, or *Grey-amber*, a perfume which is found floating on the sea, and in the intestines of the spermaceti whale. It is very much admired in Asia and Africa, where it is made use of to flavour luxurious dishes: In Europe, it is valued only as a scent. It is an ash-coloured, solid, unctuous body, yielding to a hot needle, and easily melting over a fire. When found in the body of the whale, it is soft, and very offensive in its scent; but after having been exposed to the air for some time, it becomes, like that which is taken from the water, hard, and an admirable perfume.

AMBER-HONOURABLE, is an open apology for all

injury done. The name is taken from an old custom in the criminal law of France.

AMERCEMENT, a pecuniary punishment imposed upon offenders at the mercy of the court. Amercements differ from fines, the latter depending, or proceeding from some statutes, the former one imposed arbitrarily in proportion to the fault.

AMERICA, sometimes called the New World; is styled, in geography, one of the four quarters of the globe. It is understood to have been first discovered to Europe by Christopher Columbus, who landed on one of the Bahama islands on the 19th October, 1492; and is named from Americus Vesputius, a Florentine, who, in 1497, landed on the southern part of that continent. It deserves to be remarked, however, that though individual nations may differ from each other; there is, after all, a sort of family likeness between all the inhabitants of the same quarter of the world. The dress, the language, the manners, and the manner of thinking, of all the nations of Europe, are radically the same. In each of these particulars, the Briton and the Spaniard doubtlessly vary from each other; but, compared with a Chinese, all their variations vanish. In the same point of view, all the nations of Asia resemble each other; the same connection is observable in those of Africa; and throughout America, in like manner, is to be seen the same obvious dissimilarity from the other quarters of the world, and the same varied uniformity among all its numerous and wide-spread tribes of men. In Asia, we see a people whose fathers, for thousands of years, have dwelt in cities, and lived under established governments; and in Europe and Africa, though the history of

their institutions is not so remote, the same habits have been copied: but, in America, by far the greater part of the human race have never yet united in what is called society. If, therefore, the history of the old world is interesting on account of its governments and institutions, the new presents a striking field for observation; by contrasting with the former, a portion of mankind to whom these governments and institutions have been, and still are, totally unknown. As the prevailing colour of the Europeans is white, of the Asiatics brown, and of the Africans black; so that of the Americans is red, copper-red. They pride themselves in the name of *red-men*. Their manner of living is, in a great degree, wholly independent of each other; but they form tribes or nations, and elect a military chief.

The principal districts of N. America are those of Mexico, California, Louisiana, Virginia, Canada, Newfoundland; and the islands of Cuba, Dominica, Domingo, and the Antilles (commonly called the West Indies): those of South-America are Terra-Firma, Peru, Paraguay, Chili, Magellan's Land, Brazil, and Amazonia. Of the merchandize for which it is ransacked by Europeans, the principal articles are, gold and silver in South America, and furs in the North. Pearls are brought from the islands of Las Perlas, and emeralds from the environs of S. Fé and Bogetta. The more common productions of both divisions are sugar, tobacco, indigo, ginger, cassia, mastic, aloes, cotton, cochineal, annatto, quinquina, cacao, vanilla, campeachy, wood, saffras, the balsams of Capivi, Gilead, and Tolu, Peru, Chili, jesuits bark, tamarinds,

ambengris, and a great variety of woods, roots, and plants. The animals of America, in many instances, differ very much from those of the old continent. It is hard to say how many different languages there are in America, a vast number being spoken by the different people in different parts; and as to religion, there is no giving any tolerable account of it in general, though some of the most civilized of the aborigines seem to have worshipped the sun. The principal motive of the Spaniards in sending so many colonies here was the thirst of gold; and indeed they and the Portuguese are possessed of all those parts where it is found in the greatest plenty. This vast continent is divided into N. and S. America, which are joined by the isthmus of Darien. It has the loftiest mountains, in the world, such as those that form the immense chain called the Andes; and the most stupendous rivers, such as the river Amazons, the "sea-like Plata," the Oronoko, the Mississippi, the Illinois, the Missisouses, the Ohio, the St. Lawrence, the Hudson, the Delaware, the Susquehannah, the Potomac, &c. Besides the aborigines, who inhabit the interior parts, and the United States of America, who possess some of the finest provinces that formerly belonged to Great Britain, the different European powers have rich and flourishing colonies here. The American States are fifteen in number, each having a separate local government; but they are formed into one federal republic. These states long flourished as provinces of Great Britain; but parliament attempting to tax them by its sole authority, without the intervention of their assemblies, a civil war ensued; a congress was formed, which,

in 1776, disclaimed all dependence on the mother country: the French king entered into an alliance with them in 1778; the colonies, powerfully assisted by France, were successful; and Great Britain, in 1782, acknowledged their independence in preliminary articles of peace, finally ratified by the definitive treaty in 1783. The Americans have since formed a new federal constitution. Between America (the New World) and the Old World, are several very striking differences; the most remarkable of which is, the general predominance of cold throughout the whole extent of this vast country. Here the rigour of the Frigid Zone extends over half that which should be temperate by its position, with regard to the same parallels of latitude in the Old World: and even in those latitudes where winter is scarcely felt on the Old Continent, it reigns with great severity in America, though but for a short period.

AMETHYST, a precious stone, of a violet or purple-violet colour. Its name is derived from its colour, as likened by the ancients to that of wine and water. The hues of different amethysts are as various as the tints of purple; that is, as all the mixtures of blue and red. These stones are sometimes found in the form of pebbles, and sometimes in the angular shapes usual among all chrySTALLINE objects, in the mountains of Auvergne, in Germany and Bohemia; and in a mountain of Catalonia in Spain. Amethysts may generally be discovered where chrystal is produced; for they are merely chrystals, tinged by a mineral.

AMMONIA, or volatile alkali, is composed of about 80 parts of azote and 20 of hydrogen rendered

gaseous by caloric, in which form only it is in a state of purity, though the word is commonly applied to a solution of the gas in water, with which it readily combines, forming the liquid ammonia of the shops.

AMMONIAC. The plant producing this concrete, gummy, resinous juice, is said to grow in Nubia, Abyssinia, and the interior parts of Egypt. It has been supposed a species of the *ferula*, from another species of which *asafoetida* is obtained.

AMMONIAC, SAL, a volatile salt, of which vast quantities are thrown out by Mount Etna. The sal-ammoniac now used in the shops, is artificial. When pure, this salt promotes perspiration.

AMPHIBIA. Amphibious animals or those which are capable of existing in two distinct elements as air and water. In zoology, the third class in the Linnæan system. The following is its classical character: heart, one auricle, one ventricle; blood, cold and red: jaws incumbent; organs of sense, tongue, nostrils, eyes, ears; covering, a naked skin; supporters various, in some none: creep in warm places and hiss.

They were formerly divided into four orders, nantes, and meantes, constituting the third and fourth: these have since been removed into the first two orders, which now embrace the entire class, and are denominated; 1. reptilia, reptiles: 2. serpentes, serpents: of which the first have feet, and flat naked ears without auricles; the last have no feet; eggs connected in a chain.

These last are cast upon the earth naked, without limbs, exposed to every injury; but frequently armed with a mortal venom, contained in tubular fangs, resembling teeth, placed without the upper

jaw, protruded, or retracted at pleasure, and surrounded with a glandular vesicle, by which this fatal fluid is secreted. But lest this tribe should too much encroach upon the limits of other animal life, the benevolent author of nature has armed about a fifth part only of it in this deadly manner; while in order to inspire other animals with a suspicion sufficiently extensive, he has ordained that all of them should cast their skins, as a mark of the class to which they belong. The jaws are dilatable and not articulate; and the œsophagus so lax, that they can swallow, without mastication, an animal twice or thrice as large as the neck of the deglutient serpent; the colour is variable, and changes according to season, age, or mode of living; and is frequently converted to another in the dead body; tongue filiform, bifid: skin reticulate. The term amphibious is sometimes also extended to men, who have the faculty of living a long time under water.

We have divers instances of such amphibious men; the most remarkable is of a Sicilian, named the Fish-Colas. Kircher relates, that by a long habitude from his youth, he had so accustomed himself to live in water, that his nature seemed to be quite altered; so that he lived rather after the manner of a fish than a man. A Calabrian monk at Madrid laid claim to this kind of amphibious capacity, making an offer to the king of Spain to continue twice twenty-four hours under water, without ever coming up to take breath.

AMPHICTYONS, in Grecian antiquity, an assembly composed of deputies from the different states of Greece; and resembling, in some measure, the

diet of the German empire. They decided all public differences, and disputes between any of the cities of Greece; but before they entered on business, they jointly sacrificed an ox cut into small pieces, as a symbol of their union. Their determinations were received with the greatest veneration, and even held sacred and inviolable.

AMPHITHEATRE, among the remains of antiquity, a building, in which all the spectators, by being ranged in a circular form, had equally open view of the show. These shows were generally of a barbarous nature, like the modern bull-fights in Spain, cock-fighting in England, and leopard-baiting at Calcutta, or Bengal.

AMPHION, in fabulous history, the son of Jupiter and Antiope: he played so well on the lyre, that the rocks were said to follow him, and the stones moved by his harmony, ranged themselves in order, and formed the walls of Thebes. He married Niobe, whose insult to Diana occasioned the loss of their children; when the unhappy father, filled with despair, attempted to destroy the temple of Apollo, but was punished by the loss of his sight and skill, and cast into the infernal regions.

The fable of Amphion's moving stones and raising the walls of Thebes by his harmony, has been explained by supposing that he persuaded, by his eloquence, a wild and uncivilized people to unite together and build a town to protect themselves against the attacks of their enemies.

AMPLIFICATION, in rhetoric, part of a discourse or speech, wherein a crime is aggravated, a praise or commendation heightened, or a narration enlarged, by an enumeration of circumstances, so as to ex-

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cite the proper emotions in the souls of the auditors. Such is the passage in Virgil, where instead of saying merely that Turnus died, he amplifies the circumstances of his death.

—*Ast illi solvuntur frigore membra,*

Vitaeque cum gemitu fugit indignata sub umbras.

The masters of eloquence make amplification to be the soul of discourse.

AMPLITUDE, in astronomy, an arch of the horizon intercepted between the east or west point and the centre of the sun, or a planet, at its rising or setting; and so is either north and south, or ortive and occasive. The amplitude of a heavenly body may be found trigonometrically by saying, as the cosine of the latitude, to radius, so is the sine of the declination of the body, to the sine of its amplitude.

Amplitude Magnetical, is an arch of the horizon contained between the centre of the celestial body when rising or setting, and the east or west point of the compass. It is always equal to the difference between the true amplitude and the variation of the compass.

AMULET, a charm, or preservative against diseases or enchantment. Amulets were made of stone, metal, vegetables, animals, or any thing that the imagination suggested. In some cases, they consisted of words or letters, ranged in a particular order, engraved upon wood, and fixed on some part of the body; in others, they were neither written nor engraved, but prepared with many superstitious ceremonies, and particular regard to the influence of the stars: among the Arabians, this latter species of amulet is called a talisman. It need not be added, that amulets have fallen into discredit.

ANABAPTISTS, see **BAPTISTS**.

ANACHRONISM, an error with respect to chronology whereby an event is placed earlier than it really happened.

ANAGRAM, a happy transposition of the letters of a word or sentence, in such a manner as to form another. Various examples might be adduced ; but a modern one may be most acceptable. Of the letters which compose the words "*Revolution Française*," after taking away those which make the word *veto*, the following sentence has been formed : "*Un Corse la finira ;*" i. e. "A Corsican shall finish it."

ANALYSIS, in chemistry, is the separation of any substance into its constituent parts, to ascertain their nature, relative proportions, and their mode of union. Thus, water by chemical analysis is found to consist of certain proportions of hydrogen and oxygen. Again, nitrate of ammonia is a salt composed of nitric acid, ammonia, and water, but each of these are compounds ; nitric acid consists of azote and oxygen ; ammonia, of azote and hydrogen ; and water ; of hydrogen and oxygen, so that the three simple substances which enter into nitrate of ammonia are azote, hydrogen, and oxygen.

ANAMORPHOSIS, in perspective and painting, a representation of an image either on a plane or carved surface, deformed, or distorted, which in a certain point of view appears regular and in just proportion.

ANALEMMA, a planisphere, or projection of the sphere, orthographically made on the plane of the meridian, by perpendiculars, from every point of that plane, the eye supposed to be at an infinite distance, and in the east or west point of the horizon. In this

projection, the solstitial colure, and all its parallels, are projected into concentric circles, equal to the real circles in the sphere, and all circles whose planes pass through the eye, as the horizon and its parallels, are projected into right lines equal to their diameters ; but all oblique circles are projected into ellipses, having the diameter of the circle for the transverse axis.

This instrument having the furniture drawn on a plate of wood or brass, with a horizon fitted to it, is used for resolving many astronomical problems ; as the time of the sun's rising and setting, the length and hour of the day, &c. It is also useful in dialling, for laying down the signs of the Zodiac, with the lengths of days, and other matters of furniture upon dials.

ANATOMY, the art of dissecting, or skilfully separating the solid parts of an animal, in order to discover their situation, figure, and connection. By anatomy, is generally understood the dissection of the human body in particular : that of the bodies of brutes is called, with reference to the former, comparative anatomy. The use of this art is, that by its assistance a guide is afforded to the operations of medicine and surgery. Considered by itself, it is, doubtlessly, an admirable pursuit for a contemplative mind : but if, after a steril examination of the separated parts of the body, we do not proceed to consider the whole machine re-united and complete, this labour resembles many others, which do infinite honour to the human mind, and are stupendous monuments of its patience, though unproductive of any real utility.

As a philosophic inquiry, it may be observed,

that it is impossible not to be interested in the conformation of our own bodies: as a religious one, it will not fail to impress us with the most becoming ideas of our creator. Considered as a matter of ordinary education, it cannot be too strongly recommended. No arguments, perhaps, can so effectually check the irregularities and acts of intemperance, which endanger our health and happiness, as those which a little knowledge of anatomy and medicine will suggest.—A general view of a subject is certainly the best introduction to particular investigation; and of such a nature, the following elegant and comprehensive description of the structure of the human body, by the late Dr. Hunter, will be found:

“ In order to acquire a satisfactory general idea of this subject, let us, in imagination, *make* a man; in other words, let us construct a fabric fit for the residence of an intelligent soul. This soul is to hold a correspondence with all material beings around her; and, to that end, she must be supplied with organs fitted to receive the different kinds of impressions which they will make. In fact, therefore, we see that she is provided with the organs of sense, as we call them: the EYE is adapted to light; the EAR to sound; the NOSE to smell; the MOUTH to taste; and the SKIN to touch. Farther, she must be furnished with organs of communication between herself in the brain and those organs, to give her information of all the impressions that are made on them: and she must have organs between herself in the brain and every other part of the body, fitted to convey her commands and influence over the whole. For these purposes, the NERVES are actually given. They are chords which rise from the brain,

the immediate residence of the mind; and disperse themselves in branches through all parts of the body. They are intended to be occasional monitors against all such impressions as might endanger the well-being of the whole, or of any particular part; and this vindicates the Creator of all things in having actually subjected us to those many disagreeable and painful sensations, which we are exposed to from a thousand accidents in life. Moreover, the mind, in this corporeal system, must be endued with the power of moving from place to place, that she may have intercourse with a variety of objects; that she may fly from such as are disagreeable, dangerous, or hurtful, and pursue such as are pleasant, and useful to her; and, accordingly, she is supplied with MUSCLES and TENDONS, the instruments of motion, which are found in every part of the fabric where motion is necessary: but, to give firmness and shape to the fabric; to keep the softer parts in their proper place; to give fixed points for, and proper directions to, its motions, as well as to protect some of the more important and tender organs from external injuries, there must be some firm prop-work interwoven through the whole:—and, in fact, for such purposes the BONES were given. The prop-work must not be made into one rigid fabric, for that would prevent motion. Therefore, there are a number of bones. These pieces must all be firmly bound together to prevent their dislocation: and this end is perfectly answered by the LIGAMENTS. The extremities of these bony pieces, where they move and rub upon one another, must have smooth and slippery surfaces of easy motion. This is most happily provided for by the CARTILAGES and mucus

of the joints. The interstices of all these parts must be filled up with some soft and ductile matter, which shall keep them in their places, unite them, and at the same time allow them to move a little upon one another : and these purposes are answered by the CELLULAR MEMBRANE, or adipose substance. There must be an adequate covering over the whole apparatus, both to give it compactness and to defend it from a thousand injuries ; which, in fact, are the very purposes of the SKIN, and other integuments. Lastly, the mind being formed for society and intercourse with beings of her own kind, she must be endued with powers of expressing and communicating her thoughts by some sensible marks or signs, easy to herself, and capable of great variety ; and accordingly she is provided with the organs and faculty of SPEECH, by which she can throw out signs with amazing facility, and vary them without end.

“ Thus we have built a body which seems to be pretty complete : but, as it is the nature of matter to be worked upon and altered, so, in a very little time, such a living creature must be destroyed, if there is no provision for repairing the injuries which she will commit upon herself, and those which she will be exposed to from without. Therefore, a treasure of BLOOD is actually provided in the heart and vascular system, full of nutritious and healing particles, fluid, and able to penetrate into the minutest parts of the animal : impelled by the HEART, and conveyed by the ARTERIES, it washes every part, builds up what was broken down, and sweeps away the old and useless materials. Hence we see the necessity or advantage of the heart and arterial system. What more than enough there was of the

blood to repair the present damages of the machine, must not be lost, but should be returned again to the heart; and for this purpose the VEINS are actually provided. These requisites in the animal explain *a priori*, the CIRCULATION of the blood. The old materials, which are become useless, and are swept off by the current of the blood, must be separated and thrown out of the system. Therefore the GLANDS, the organs of secretion, are given for straining whatever is redundant, vapid, or noxious, from the mass of blood; and, when strained, they are thrown out by EMUNCTORIES, called organs of excretion. But now, as the machine must be constantly wearing, the operations must be carried on without intermission, and the strainers must be always employed: therefore, there is actually a perpetual circulation of the blood, and the secretions are always going on. Even all this provision, however, would not be sufficient: for that store of blood would soon be consumed, and the fabric would break down, if there were not a provision made for fresh supplies. These we observe in fact are profusely scattered round her in the animal and vegetable kingdoms; and she is furnished with hands, the fittest instruments that could have been contrived, for gathering them, and for preparing them in a variety of ways for the mouth. But these supplies, which we call food, must be considerably changed: they must be converted into blood. Therefore, she is provided with teeth for cutting and bruising the food, and with a stomach for melting it down: in short, with all the organs subservient to digestion.—The finer parts of the aliments only can be useful in the constitution; these must be taken

up and conveyed into the blood, and the dregs must be thrown off. With this view, the INTESTINAL CANAL is actually given. It separates the nutritious part, which we call CHYLE, to be conveyed into the blood by the system of the ABSORBENT VESSELS; and the feces pass downward out of the body. Thus we see that, by the very imperfect survey which human reason is able to take of this subject, the animal man must necessarily be complex in his corporeal system, and in its operations; and in taking this general view of what would appear, *à priori*, to be necessary for adapting an animal to the situations of life, we observe, with great satisfaction, that man is accordingly made of such systems, and for such purposes. He has them all; and he has nothing more, except the organs of respiration. Breathing it seemed difficult to account for *à priori*: we only know it to be a fact, essentially necessary to life. Notwithstanding this, when we saw all the other parts of the body, and their functions so well accounted for, and so wisely adapted to their several purposes, there would be no doubt that respiration was so likewise: and accordingly, the discoveries of doctor Priestley have lately thrown light upon this function also.

“Of all the different systems in the human body the use and necessity are not more apparent, than the wisdom and contrivance which have been exerted in putting them all into the most compact and convenient form: in disposing them so that they shall mutually receive and give helps from one another; and that all, or many, of the parts shall not only answer their principal end or purpose, but operate successfully and usefully in a variety of secondary

ways. If we consider the whole animal machine in this light, and compare it with any, in which human art has exerted its utmost skill (suppose the best-constructed ship that ever was built), we shall be convinced, beyond the possibility of doubt, that there exists intelligence and power far surpassing: what human art can boast of. One superiority in the animal machine is peculiarly striking. In machines of human contrivance, or of art, there is no internal power, no principle in the thing itself, by which it can alter and accommodate itself to any injury that it may suffer, or make up any injury that admits of repair; but in the natural machine, or animal body, this is most wonderfully provided for by the internal powers of the machine itself; many of which are not more certain and obvious in their effects, than they are above all human comprehension as to the manner and means of their operation. Thus, a wound heals up of itself; a broken bone is made firm again by a callus; a dead part is separated and thrown off; noxious juices are driven out by some of the emunctories; a redundancy is removed by some spontaneous bleeding; a bleeding naturally stops of itself; and a great loss of blood, from any cause, is in some measure compensated by a contracting power in the muscular system, which accommodates the capacity of the vessel to the quantity contained. The stomach gives information when the supplies have been expended, represents with great exactness the quantity and quality of what is wanted in the present state of the machine, and in proportion as she meets with neglect rises in her demand, urges her petition in a louder tone, and with more forcible arguments. For its

protection, an animal body resists heat and cold in a very wonderful manner, and preserves an equal temperature in a burning and in a freezing atmosphere. These are powers which mock all human invention or imitation: they are characteristics of the divine architect!"

ANATHEMA, among ecclesiastical writers, imports whatever is set apart, separated or divided; but the word is most usually intended to express the cutting off a person from the privileges of society, and from communion with the faithful. The anathema differs from simple excommunication, in as much as the former is attended with curses and execrations.

ANCIENT, **OLD**, **ANTIQUE**, are words that express age, in different degrees. A fashion is old when it ceases to be used; ancient when it has been long out of use; and antique when it has been long ancient. Young is opposed to old; new to ancient; and modern to antique. A man is said to be old, a family ancient, a statue or other monument antique. Old implies decrepid; ancient, immemorial; antique, remote. Old age diminishes the powers of the body, and enlarges the extent of the mind; ancientness takes away the beauty of garments, and gives authority to titles; antiquity weakens the evidence of history, and gives value to monuments. The epochs beyond which it is now generally agreed to call men and their works ancient, is that of the taking of Constantinople by Mahomet II. which event happened A. D. 1453. It was then that Europe began to re-emerge from barbarism. Tuscany opened her arms to men of genius in arts and literature, who took refuge in her bosom from the general storm.

ANCIENT LANGUAGES. Much has been said, and much may always be said, for and against the study of what are called the dead languages ; such as Hebrew, Greek, and Latin, which are now only to be met with in books. A liberal man will, perhaps, wholly join with neither the one disputant nor the other. In all cases, those who give their thoughts to the past, to the neglect of the present, are to be blamed. If history is interesting, if antiquities, the documents of history, are interesting, then ancient languages must be interesting also.

ANCIENT LEARNING. Interested as we are in the history of man, we cannot be indifferent to those writings which have come down to us from ancient times. If we are unacquainted with ancient learning, we can scarcely avoid error in our estimate of its value : we shall probably reverence it too much or too little. Certainly, neither ancient learning, nor any thing else that is ancient, is essential to the education of a good member of society ; but it is very essential to taste, without a certain mixture of which, all the ingredients of society must soon become vitiated. While on the one hand, however, it does not appear rational to join with those who would banish an inquiry into ancient learning from among the number of human studies, it is on the other most undoubtedly true, that the attainments of the ancients are frequently over-rated. We have availed ourselves of their discoveries, we have perceived many of their mistakes ; and though we may have lost part of their lessons, and committed new errors of our own, still it is absurd to suppose that we have not surpassed them.

ANCIENT TIMES. Remote periods of antiquity.

Nothing can more forcibly show the use of an acquaintance with ancient learning, and, consequently, with ancient languages, than the erroneous opinions which are entertained of ancient times. Error can be dispelled only by knowledge. Our mistakes concerning ancient times are commonly these: 1. We suppose modern days to be greatly superior in arts and luxuries; and, 2. We give antiquity credit for a vast superiority in virtue. The first position, all history contradicts; and it will show, that with all their vices on their heads, public and private, the moderns can suffer nothing by comparison with the ancients. The history of ancient times evinces, that they witnessed the practice of all virtue; and not less will that of our own afford the same honourable testimony to the character of mankind. He that judges impartially, will confess, that in the past there will always be something to regret, in the present to condemn, and in the future to desire.

ANCHOR, a heavy, strong, crooked instrument of iron, cast or dropped from a ship into the water to retain her in a convenient station in a harbour, road, or river. Anchors were originally mere weights; at present they are intended to fasten in the ground as hooks. They are contrived so as to sink into the earth as soon as they reach it, and to hold a great strain before they can be loosened or dislodged. They are composed of a shank, a stock, a ring, and two arms with flukes. The stock, which is a long piece of timber fixed across the shank, serves to guide the flukes in a direction perpendicular to the surface of the ground; so that one of them sinks into it by its own weight, as soon as it falls, and is still preserved steadily in that position by the stock,

which, together with the shank, lies flat on the bottom. In this situation, it must necessarily sustain a great effort before it can be dragged through the earth horizontally. Every ship has, or ought to have, three principal anchors, with a cable to each, viz. the *sheet*, the *best bower*, and the *small bower*, so called from their usual situation on the ship's bows. There are besides small anchors for moving a ship from place to place in a harbour or river, where there may not be room or wind for sailing: these are the *stream-anchor*, the *kedg*e, and the *grapnel*. The last, however, is chiefly designed for boats.

ANCONY, in the iron-works, a piece of half-wrought iron, of about three quarters of a hundred weight, of the shape of a bar, at the middle, but rude and unwrought at the ends. To bring the iron into this state, a piece of a proper size, from a *sow* of cast iron, is melted: this is hammered at the forge into a mass of two feet long, and of a square shape, which is called a *bloom*; when this is done, it is sent to the *finery*, where, after two or three heats and workings, it is brought to this figure, and called an *ancony*. The middle part, beat out at the finery, is about three feet long, and of the shape and thickness that is to be given to the whole: this is then sent to the *chafery*, and there the ends are wrought to the shape of the middle, and the whole is made into a bar.

ANDES, or Cordillieras, a great chain of mountains, which run almost the whole length of South America. They are the highest and most remarkable mountains in the world; for those within the torrid zone are always covered with snow; and in passing over the lower part of them, people are in

danger of being starved with cold. There are a great many volcanos, which break out sometimes in one place, and sometimes in another; and by melting the snow, occasion such a torrent of water, that numbers of men and cattle have perished.

ANDROIDES, a piece of mechanism representing a human figure, and performing human actions. The word signifies the human figure: it is an *automaton*, but it is precisely an *automaton of the human figure*. A very celebrated contrivance of this kind was made by M. Vaucanson, in the year 1738. It played upon the flute with a degree of excellence that gave pleasure even to connoisseurs. See *Automaton*.

ANEMOMETER, a machine for measuring the force and velocity of the wind. Several have been invented, but it will be sufficient to mention one. This consists of small sails, like those of a mill, from the axis of which two weights depend.

ANEMOSCOPE, a machine that shows either the course or the velocity of the wind. There is an anemoscope upon one of the wings of Buckingham house, and another at Somerset-place. These instruments, which, however, differ in their construction from others that have been invented, externally, resemble a clock. The dial plate represents the thirty-two points of the compass; and the index, or hand, is regulated by a vane, or weather-cock.

ANGEL, the name of an ancient gold coin in England, so called from the figure of an angel upon it. It weighed four pennyweights.

ANGLE, in geometry, the opening, or mutual inclination, of two lines, or of two or more planes, meeting in a point called the vertex, or angular point.

The most general division of angles is, into plane, spherical, and solid.

Angle, a plane, rectilineal, is the inclination of two straight lines to one another, which meet together, but are not in the same straight line. See Fig. 6.

Angle, spherical, is an angle formed on the surface of a sphere by the intersection of two great circles; or, it is the inclination of the planes of the two great circles. Fig. 7.

The measure of a spherical angle, is the arc of a great circle of the sphere, intercepted between the two planes which form the angle, and which cuts the said plane at right angles.

Angles, solid, is the mutual inclination of more than two planes, or plain angles, meeting in a point, and not contained in the same plane; like the angles or corners of solid bodies.

Angles are sometimes denoted, or named, by the single letter placed at the angular point, as the angle A; and sometimes by three letters, placing always that of the vertex in the middle. The former method is used when only one angle has the same vertex; and the latter method is necessary when several angles have the same vertex, to distinguish them from one another. See Fig. 6. and 8.

Angles in mechanics. 1. Angle of direction, is that comprehended between the lines of direction of two conspiring forces. 2. Angle of elevation, is that which is comprehended between the line of direction, and any plane upon which the projection is made, whether horizontal or oblique.

Angle of incidence, in optics, the angle which a ray of light makes with a perpendicular to that point of the surface of any medium on which it.

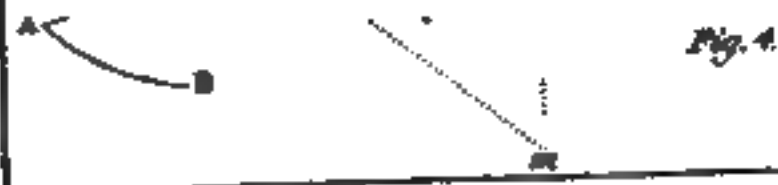
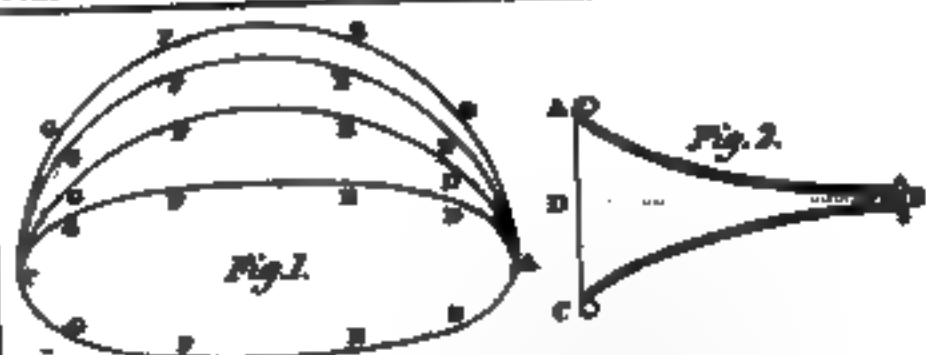
falls; though it is sometimes understood of the angle which it makes with the surface itself.

Angle of refraction, now generally means the angle which a ray of light, refracted by any medium, makes with a perpendicular to that point of the surface, on which it was incident; but has sometimes been understood of the angle which it makes with the surface of the refracting medium itself. It is a constant law of refraction that the ratio of the sines of incidence and refraction, is a fixed ratio, whatever be the obliquity of the incident ray, the media remaining.

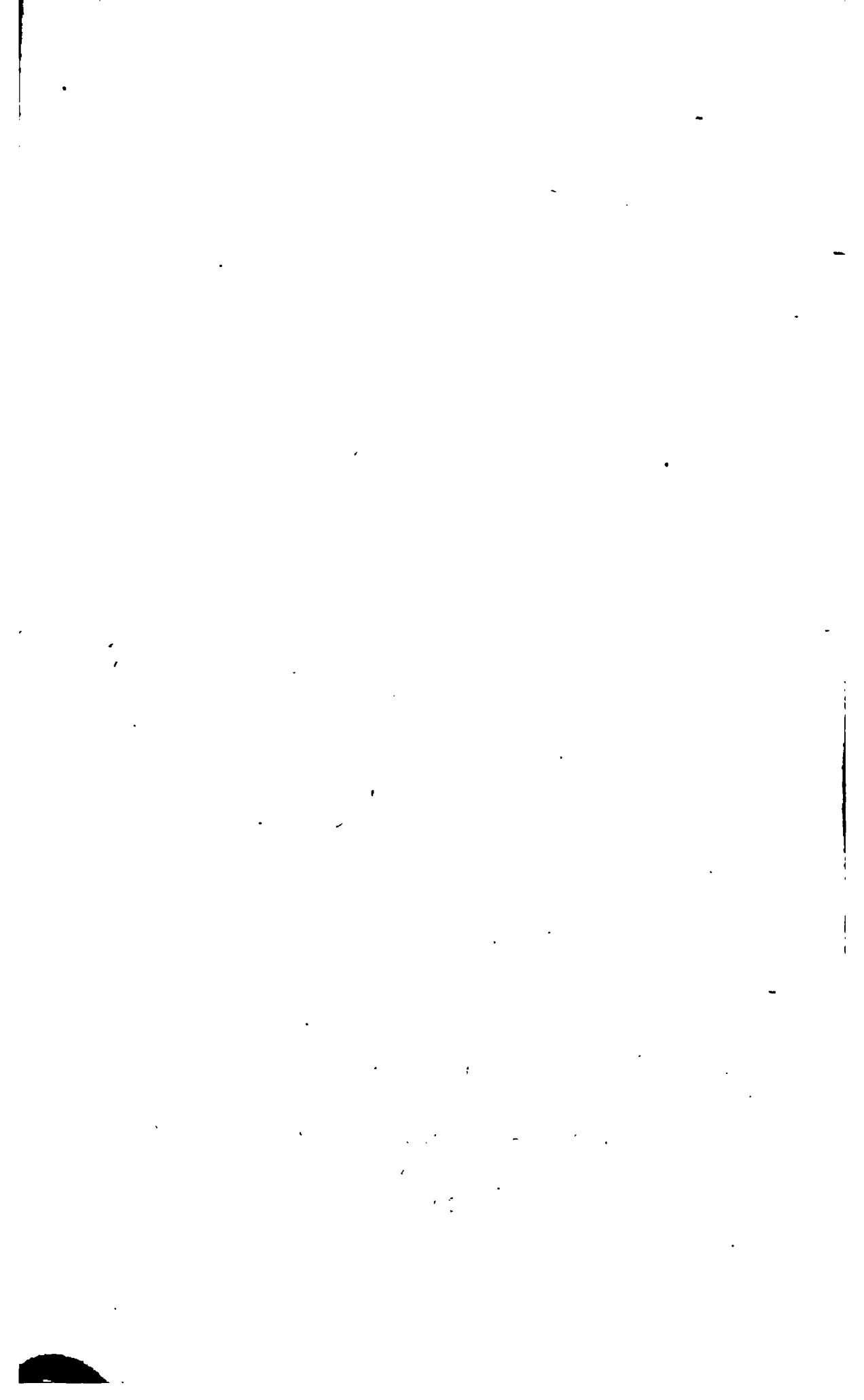
Angles, in fortification, are understood of those formed by the several lines used in fortifying, or making a place defensible.

ANGLING, a method of catching fish, singly, by means of a baited hook, appended to a rod and line. Various methods are suggested, by those who treat on angling, for attracting fish to the spot. In standing waters, this is by no means difficult: a quantity of grains, chopped worms, or other food, is thrown by way of invitation. In small running streams, those to whom they belong can easily confine their fish to any given part; but, in rivers, the following expedient is employed; a box made of tin, and capable of holding several hundred worms, is to be procured. It must be pierced with holes sufficiently large to permit the escape of the worms, and furnished with a weight that will cause it to sink, and a line to draw it back at pleasure. This being lowered into the water, the worms will crawl out, the fish assemble, and the angler, who throws in his hook higher up the stream, and suffers it to be carried down with it, if there be no pike in the





Copper engr.



neighbourhood, succeeds in his design. The angler is recommended to keep himself out of sight of the fish, by standing under a tree, or so far from the water that he can but just observe the float. The rod is to be kept in a moderate state of moisture; as if too dry it is brittle, and if too wet, rotten. In a pond, the best place for the angler to take his stand is usually that used by cattle. In rivers, if bream is fished for, it should be in the deepest and most quiet places; if eels, under overhanging banks: perch are to be expected in clean places, where the stream is swift; and chub in deep-shaded holes: roach are most commonly found in the same places as perch, and trout only in swift and clear streams. The best season is from April to October: the cooler the weather, in the hottest months, the better; but in winter, on the contrary, the warmest day is the most promising. A cloudy day, after a moonlight night, is always favourable; as the fish avoid feeding by moonlight, and are therefore hungry. Warm, lowering days are always coveted by anglers.

ANIMAL. If the term be disputed, it is very difficult to define what classes of created things are strictly animal: in a general sense, it is applied to every thing that is supposed to be alive to the sensations of pain and pleasure. Under the name of animal, therefore, are included men, quadrupeds, birds, fishes, reptiles, and insects. Animal literally means a *living thing*: but plants live. Linnæus has formed a climax of the grand departments of creation: stones grow; vegetables grow and live; animals grow, live, and feel. See **NATURAL HISTORY**.

Animal acids, are those which have been discovered in animal substances, or which contribute to

their formation. These are, the acetic, the amniotic, the benzoic, the carbonic, the lactic, the malic, the muriatic, the oxalic, the phosphoric, the rosacic, the sulphuric, and the uric: many of them, however, are not peculiar to animals, but are frequently found both in vegetables and minerals.

ANIMAL-flower. The reverend Griffith Hughes, in his natural history of the island of Barbadoes, gives the following account of a very curious object in nature, which he calls the animal-flower: "The cave that contains this animal is near the bottom of a high rocky cliff facing the sea, in the parish of St. Lucy. Its bottom forms a natural bason of about sixteen feet in breadth; and when the wind is high, and at a certain point, the sea breaks into it, and it is thus kept full of water, which, with the exception of a small quantity that oozes from the roof of an anterior cavern, is intirely salt. In the middle of the bason, rises a small rock, which is always under water. Round the sides of this stone, at different depths, but seldom more than eighteen inches below the surface, are seen, at all seasons of the year, fine radiated flowers of a pale yellow, or bright straw-colour, slightly tinged with green. They have a circular border of petals, thickly set, and resembling, both in shape and size, the single garden-marygold. The whole of this seeming flower, however, is narrower at the *discus*, or central circle, round which the leaves adhere, than any other flower of that kind. I attempted to pluck one of these flowers from the rock to which they are always fixed, but found, to my surprise, that I was unable to touch it. When my fingers were under water, and had approached within two

or three inches of their object, it immediately contracted, closed its yellow border, and retreated into the hole from which it issued. If left undisturbed for the space of about four minutes, it gradually returned into sight; expanding, though at first with caution, its seeming leaves, and, at length, redisplaying its mysterious bloom: whenever my hand had nearly reached it, it constantly recoiled; and the effect was the same if I used a cane or slender twig. These were strong characteristics of animal life: yet, as its form and want of local motion classed it among vegetables, I was for some time in suspense, and imagined it to be an aquatic sensitive-plant. Though its contraction to avoid the touch was performed with more quickness than by any plant that I had seen of that description, yet, its seeming leaves might be, and in reality were, of a far thinner and more delicate texture than those of any known flower; and the weight of the water, so much greater than that of air, might contribute to this celerity. With respect to the extreme thinness of the petals, I had once an opportunity of ascertaining the fact: for though I could not, by any means, contrive to take or pluck from the rock one of these animals entire, I was fortunate enough to succeed, after waiting for some time with a knife near the mouth of a hole, in cutting off two deceptions leaves. When out of the water they retained, for a short time, their shape and colour; they were composed of a membrane-like substance, surprizingly thin; and they soon shrivelled up and decayed. I was inclined, then, till a subsequent visit decided my opinion, to consider this flower as a sensitive-plant: but I now plainly saw four dark-

coloured resemblances of threads, something like the legs of a spider, rising out of the centre of the leaves. Their quick spontaneous motion, from one side to the other of this circular border of seeming leaves, which, in reality, were so many arms or feelers, and their closing together like a forceps, as if they had hemmed in their prey, which the yellow border likewise soon surrounded and closed to secure, fully convinced me that it was a living creature. Its body, at a distance, appears to be about as big as a raven's quill, and of a blackish colour; the one end sticking to the rock, the other extending a very small distance from it; and incircled with a yellow border, as above described. Now, since the same goodness and wisdom which give being to creatures, preserve them in that being or existence by ways and means as wonderful as their creation itself, we may conjecture, with some probability, the intention of the amazing providence of God in induing this animal's arms or feelers with a fine yellow colour, and ordering it to differ, in this particular from the several tribes of fungous animals that are usually found cleaving to the rocks in the sea. These latter, may be fed with spawn, or other animalcules, which the flux and reflux of the waves throw in their way; and, in this case, there is no need of any uncommon means for enticing their prey, even supposing it to be animal, within their reach: but still water, like that in the cave, will not, in the same manner, of itself convey this supply of food. Here then, some extraordinary temptation is requisite, in order to allure the prey within the reach of the stationary animal that is to be fed. To this end, the fine brilliant colour that has been

described may have been given to the creature in question: for, as rays of light, or what resembles them, are inviting to almost every thing that lives, the beautiful border may serve as a decoy. . . All the species of this creature are not, however, of the same colour. . In the uppermost part of the same rock, there are innumerable clusters of what are provincially called *water-bottles*, very much resembling scattered clusters of unripe grapes: the outside consisting of a bluish skinny tegument, like that of a grape, and the inside filled with water, in a somewhat turbid state. Among these are a great number of the animal-flowers. Like the yellow ones, they are fixed to the rock, not in holes, but sticking to the surface, among the water-bottles, and generally not more than nine inches under water. The leaves, or rather feelers, of these, are of a greyish-purple colour, variegated with black spots. . Other animal-flowers, of a bluish green colour, some of which are not larger than an English two-penny piece of silver, grow in clusters upon the rocks. None of these latter sorts are so sensitive as the yellow; and they vary from each other. Having plucked one of those growing among the water-bottles, I found the body, which was about an inch long, to possess a sensible vermicular motion. The feelers, likewise, which decorated one end of it, when exposed to the air, shrunk up, and remained as lifeless; but as soon as the whole was dipped in the water, they would, as it were, assume a new life, and appear again in their full vigour. Soon after the discovery of these surprising animals, a great number of people came to view them: but as this was attended with some

small inconvenience to the person through whose lands they were obliged to pass, he, to get rid of the company resolved to destroy this object of their curiosity. In order to do this effectually, he took a piece of iron, prepared for the purpose, and carefully bored and drilled every part of the holes in which these seeming flowers were bred; but to his great surprise, in a few weeks, they appeared again, issuing out of the same holes.—Let us here, for a while, stop and consider whether our much-boasted reason can find out how even a latent principle of life can be preserved after the whole organic body is torn in pieces? When we see this animal, in a short time after its apparent destruction, resuscitate, and appear in its former proportion, beauty, and life, can we, after such an ocular demonstration of so astonishing a change in a creature destined for this life only, and removed, in all appearance, but a few degrees from the vegetable creation, any longer entertain doubts about the reasonableness of another doctrine of a far greater consequence? And as every past age has been, so, undoubtedly, every future will be, blest with some surprising new discovery of the unsearchable power and wisdom of God."

ANIMAL FUNCTIONS, are those by which the materials, that constitute and support the bodies of animals, are prepared and supplied. The principal of these functions are the following—circulation, digestion, nutrition or assimilation, respiration, and secretion, which are employed in producing animal matter from the substances that compose it. But, besides these, there are others, which though they do not act chemically, like the foregoing, are in many animals subservient to various important purposes.

ANIMAL HEAT. Heat is essentially necessary to life. That of a man in health is from about 94° to 100° of Fahrenheit. It appears to depend upon the absorption of oxygen in the lungs.

ANIMAL LIFE, it is difficult to mark the line, where vegetable life ends, and animal life begins. Animal life may be described that kind of existence, which enables its possessor to follow the dictates of its own will; renders it susceptible of pleasure both through the medium of the senses and of the imagination; subjects it, at the same time, to a similar sensibility to pain; endows it, in short, with a twofold being. The plant, as we suppose, is invigorated by the approach of spring without enjoying any attendant pleasure; whereas, the smallest fly receives from the beams of the sun, a mental as well as corporeal gratification.

ANIMAL MAGNETISM, a pretended science, the temporary reputation of some impudent pretenders to a knowledge of it, is one among the numerous proofs of the imbecility of the human understanding. The reader will clearly apprehend, that it supposes an attractive power by means of which the animal economy may be operated upon. It originated with father Hehl, a German philosopher, who, in 1774, strongly recommended the use of the magnet in medicine: but the founder of the imposture in question, was M. Mesmer, a physician of the same country, who, leaving his native land, where he obtained but little credit, flourished in a most extraordinary manner at Paris, about the years 1778 and 1779. M. Deston, a pupil and coadjutor of Mesmer, is said to have realized £.100,000 sterling by his practice; and this person explained the

principles of his art in the following manner. I. Animal magnetism is an universal fluid, constituting an absolute plenum in nature, and the medium of all natural influence between the celestial bodies, and between the earth and animal bodies. II. It is the most subtile fluid in nature; capable of a flux and reflux, and of receiving, propagating, and continuing, all kinds of motion. III. The animal body is subjected to the influences of this fluid by means of the nerves, which are immediately affected by it. IV. The human body has poles, and other properties, analogous to the magnet. V. The action and virtue of animal magnetism may be communicated from one body to another, whether animate or inanimate. VI. It operates at a great distance, without the intervention of any body or medium. VII. It is increased and reflected by mirrors; communicated, propagated, and increased by sound; and may be accumulated, concentrated, and transported. VIII. Notwithstanding the universality of this fluid, all animal bodies are not equally affected by it; on the other hand, there are some, though but few in number, the presence of which destroys all its effects. IX. By means of this fluid, nervous disorders are cured immediately, and others mediately; and its virtues, in short, extend to the universal cure and preservation of mankind.—A similar imposture was practised with success, many years in London, by an American, who rightly appreciating the credulity of our countrymen, sold for five guineas a couple of pieces of metal intrinsically not worth as many farthings, under the alluring title of METALLIC TACTONS. The inventor having realized, it is

supposed, a good fortune, returned to his own country, laughing at the folly of those, whom he had so easily duped.

ANIMAL MATTER. Under this term are comprehended all the various kinds of substances, of which animal bodies are composed; not so much, however, with regard to the radical principles of which they consist, as to those particular and exclusive forms, in which they exist, throughout all the tribes of the animal kingdom, as far as they have been subjected to examination.

ANIMALCULE (a little animal), is a term which may be applied to any living creatures, whose existence, cannot be discovered without the aid of glasses. Naturalists suppose, and with great reason, that there is a farther order of animacules which escape the cognizance of even the best microscopes. The naked eye takes in a series from the elephant to the mite: at this point commences a new class of animals, which comprehends all those from the mite to those many millions of times smaller than the mite; and this class cannot be said to be wholly discovered, unless the microscope be also said to have attained its greatest possible perfection.

ANIMALCULES are said to be the cause of various disorders. The itch, from several experiments, is affirmed to be a disorder arising from the irritations of a species of animalcula found in the pustules of that disease, whence the communication of it by contact from one to another is easily conceived, as also the reason of the cure being effected by cutaneous applications.

ANIMATION, in physiology, signifies life itself: to the complete existence of which, the healthful

condition of all the organs of the body, and the due concurrence of all the elements, are necessary.

ANIMATION suspended. Life may suffer considerable diminution of its powers, and even a total suspension, without being absolutely destroyed. The action of the lungs, and consequently all the functions of the body, depend upon the free use of air. The want of this great principle of life, causes faintings in crowded assemblies; and it is from the same privation of air that drowning and suffocation produce death. Various methods are employed to recover those who have unfortunately fallen into accidents of this nature. In England, a most laudable institution exists for the purpose of recommending and supplying a successful method of relief. See **HUMANE SOCIETY**.

ANNALS, a species of history, wherein events are related in the chronological order they happened. It differs from a perfect history, in being only a mere relation of what passes every year, as a journal is of what passes every day; whereas history relates not only the transactions themselves, but also the causes, motives, and springs of such actions. Cicero informs us that the Pontifex Maximus, in order to preserve the memory of events, wrote what passed each year on tablets, which were exposed to public inspection in his own house. These tablets were called *annales maximi*; hence the writers who imitated this method of writing were stiled *annalists*.

ANNATES, among ecclesiastical writers, a year's income of a spiritual living. These were, in ancient times, given to the pope through all Christendom upon the decease of any bishop, abbot, or

parish clerk, and were paid by his successor. At the Reformation they were taken from the pope, and vested in the king; and, finally, queen Anne restored them to the church, by appropriating them to the augmentation of poor livings.

ANNEALING, by workmen called nealing, is a practice in the manufacture of vessels of glass or of cast iron. These two materials, contrary to the nature of most others, increase in bulk as they cool. If a vessel of glass, or cast iron, be suffered to cool too quickly, it may be broken by the slightest touch. It is remarkable, in the case of glass, that the gentler the stroke it receives, the greater the danger. A pistol bullet may be dropped into it without injury, while a little sand will cause it to burst, a few seconds after it has fallen. Annealing, then, is the placing vessels of these substances in a kind of oven or furnace, where they are suffered to cool gradually. Glass or cast iron, that has not undergone this process, is called unannealed. By annealing, the glass is left for some time in a state approaching to fluidity; the heat increases the bulk of the chrystalized part, and renders it so soft that the internal parts have an opportunity of expanding and forming a regular chrystalization. A similar practice is now adopted for rendering kettles and other vessels of cast iron less brittle; and of this the same explanation may be given. The greater number of metals diminish in bulk when they pass from a fluid to a solid state; iron, on the contrary, expands. The outside cooling, first, does not permit the inner part of the fluid to expand, and this, in consequence, remains in a granular and unconnected state.

ANNOTTA, or *Arnotta*, in dyeing, an elegant red colour, formed from the pellicles or pulp of the seeds of the bixa, a tree common in South America. It is also called *Terra Orleana*, and *roucou*. In making it, the red seeds are steeped in water till the liquor begins to ferment, then strongly stirred and stamped with wooden beaters, to promote the separation of the red skins; this process is repeated several times, till the seeds are left white. The liquor passed through close cane sieves, is pretty thick, of a deep red colour, and a very ill smell. In boiling, it throws up its colouring matter to the surface in form of scum, which is afterwards boiled down by itself to a due consistence, and made up while soft into balls. To rectified spirit of wine it very readily communicates a high orange or yellowish red, and hence is used as an ingredient in varnishes for giving an orange cast to the simple yellows. Alkaline salts render it perfectly soluble in boiling water, without altering its colour. Wool or silk boiled in the solution acquires a deep, but not a very durable orange dye.

ANNUITY, a sum of money payable yearly, half-yearly, or quarterly, to continue a certain number of years, for ever, or for life. An annuity is said to be in arrear, when it continues unpaid after it is due; and in reversion, when it is to fall to the expectant at some future time. Interest on annuities may be computed in the way of simple or of compound interest; but compound interest being most equitable, is universally used. See **LIFE ANNUITIES**.

ANNULET, in architecture, a small square member in the Doric capital, under the quarter round. It is also a narrow flat moulding, which is common to

divers parts of the columns, as the bases, capitals, &c. It is the same member which Vitruvius calls a fillet.

ANOMALY, in astronomy, is an irregularity in the motion of a planet, by which it deviates from the aphelion or apogee ; or it is the angular distance of the planet from the aphelion or apogee ; that is, the angle formed by the line of the apses, and another line drawn through the planet.

Kepler distinguishes three kinds of anomaly, true, mean, and excentric.

ANODYNE, a taker away of pain; a term applied to medicines which ease pain, and procure sleep. They are divided into three classes : 1. Paregorics, or such as assuage pain ; 2. Soporifics, or such as relieve by procuring sleep ; and, 3. Narcotics, or such as ease the patient by stupifying him. Opiates and narcotics destroy sensation.

A'NSES. In zoology, the third order of the Linnéan class aves : thus ordinally characterized. Bill smooth, covered with a soft skin, and broader at the point, feet formed for swimming ; toes palmate, connected by a membrane ; shanks short, compressed ; body fat, downy ; flesh mostly tough ; food, fishes, frogs, aquatic plants, worms, &c. nest mostly on the ground ; the mother takes but little care in providing for the young. There are eleven genera divided into those that have bills with, and bills without teeth. This order comprehends all kinds of water fowl.

A'NTHOS, *Anthus*. 1. The anther, or uppermost part of the stamen of a flower. 2. The entire flower, or corol itself. 3. The floescent parts or flowers of minerals. 4. The aroma or fine volatile

parts, or essences of spirits and other chemical preparations.

ANTICHRIST is a term particularly used for a tyrant who is to reign on earth, toward the end of the world ; to make the ultimate proof of the elect ; and to give a shining instance of the divine vengeance, before the last judgment.

The bible and the fathers all speak of Antichrist as a single man ; though they assure us, that he is to have divers précurseurs, or fore-runners. Yet many protestant writers apply to the Romish church, and the pope, who is as the head of it, the several marks and signatures of antichrist enumerated in the Apocalypse ; which would rather imply antichrist to be a corrupt society, or a long series of persecuting pontiffs, than a single person. Or rather, a certain power or government, that may be held for many generations, by a number of individuals succeeding one another. See *Letters on the Prophecies*, Johnson and Co, 1810.

ANNIMONY, a metallic substance of a greyish white colour, considerable brilliancy, and strongly resembling tin, or silver. Its texture is laminated, and the lamina appear arranged one over another, and crossing in every direction : its surface often exhibits a kind of crystal, in the form of stars or fir-leaves. It is very brittle, and easily pulverized ; melts, when heated just to redness, at about 810 deg. Fahrenheit ; evaporates, if the heat be increased ; communicates to the fingers a peculiar taste and smell when rubbed upon them. Its specific gravity varies from 6.702 to 6.86. The substance to which this name has been commonly, though erroneously applied, is a mineral, or ore of

antimony, composed of a mixture of sulphur with that metal ; and it is accordingly, in the language of modern chemistry, denominated a sulphuret of antimony.

ANTINOMIANS, a sect of christians, who pretend that the gospel dispenses with the observance of the moral law ; who regarding virtuous conduct as insufficient to deserve or obtain salvation, teach that no attention to its precepts is necessary, or, rather, efficacious : as if these were incompatible with the dogmas of religion : and as if the gospel were not the completion and perfection of the law of nature. No terms can express the horrid depravation of manners, and utter destruction of all true religion, to which this doctrine must generally lead : at the same time, it is easy to perceive, that its origin is to be attributed to an enthusiastic and misinformed devotion, rather than to vice.

ANTIPATHY is reckoned by many, a natural horror and detestation, an insuperable hatred, an involuntary aversion, which a sensitive being feels for some other object, whatever it is, though the person who feels this abhorrence is entirely ignorant of its cause, and can by no means account for it. Such is the invincible aversion of particular persons against cats, mice, spiders, &c. ; a prepossession which is sometimes so violent, as to make them faint at the sight of these animals.

M. C. G. Lehmann, in his observations on the manner in which the spider spins its web, speaking of this antipathy : says " It is of importance to consider by what means that aversion commonly called natural, and which is merely the result of improper education, can be overcome. Rosel ac-

customed himself to view these insects first at a distance. He then considered their webs; and at last looked at the insects themselves through a microscope. Goze first viewed individual parts of spiders, such as the legs, head, &c. till he was at length able to look without any sentiment of aversion at the entire insect. Both these naturalists, by long habit, so far overcame this aversion, that they could handle and examine spiders with the same indifference as others can flies."

ANTIPODES, in geography, a name given to those inhabitants of the globe that live diametrically opposite to each other. The antipodes lie under opposite meridians and opposite parallels; in the same degree of latitude, but of opposite denominations, one being north and the other south. They have nearly the same degree of heat and cold, and days and nights of equal length, but opposite seasons. It is noon to one, when it is midnight to the other; and the longest day with the one, is the shortest with the other. The terms upward and downward are merely relative, and signify nearer to, and farther from, the centre of the earth, the common centre to which all heavy bodies gravitate: wherefore, our antipodes, or the people who, with respect to us, seem to walk with their heads downward, have not their feet upward, nor their heads downward, any more than ourselves; because they, like us, have their feet nearer to the centre of the earth, and their heads farther from it. We all tend toward the centre of the earth in a direction from head to foot.

ANTIQUITIES, such documents of ancient history as industrious and learned men have collected;

genealogies, inscriptions, monuments, coins, names, etymologies, archives, mechanical instruments, fragments of history, &c. Antiquities form a very extensive science, including an historical knowledge of the ancient edifices, magistrates, habiliments, manners, customs, ceremonies, religious worship, and other objects, worthy of curiosity, of all the principal nations of the earth. This science is not a matter of mere curiosity: it is indispensable to the divine, who ought to be thoroughly acquainted with the antiquities of the jews, to enable him properly to explain numberless passages in the old and new testaments; to the lawyer, who, without the knowledge of the antiquities of Greece and Rome, can never well understand, and properly apply, the greater part of the Roman laws; to the physician and philosopher, that they may have a complete knowledge of the history and principles, or the physic and philosophy of the ancients; to the critic, that he may comprehend and interpret ancient authors; to the orator and poet, who will thereby be enabled to ornament their writings with numberless images, allusions, and comparisons.

ANTITHESIS, a figure of rhetoric, which consists in opposing thoughts to one another, to increase their force. "Antitheses, well managed, (says Bohours), give infinite pleasure in the perusal of works of genius; they have nearly the same effect in language as lights and shadows in painting, which a good artist distributes with propriety: or the flats and sharps in music, which are mingled by a skilful master." The antithesis is a favourite ornament with young writers: it gives energy, and, like all other departures from the straight road, its

reputation depends upon its success. The following is an example:

*Polite, as all her life in courts had been ;
Simple, as courts she never yet had seen.*

Lyttleton.

ANTITRINITARIANS, those who deny the existence of the trinity, and assert, that there are not three persons in one God. Such are Arians, who admit that Jesus Christ existed with his father before all worlds, but maintain that he is subordinate and inferior to the father, and his messenger and most high prophet. Such are Unitarians, or, as they were formerly denominated Socinians, who hold that Jesus Christ, though a messenger and the highest prophet ever commissioned by Almighty God, for purposes of mercy to mankind, is only a man, born as others of the human race are born, and that he never had existence, till his birth of Mary.

ANTOCCI, an appellation given to those inhabitants of the earth, who live under the same meridian, but on different sides of the equator, and at equal distances from it.

AORTA, a large artery arising with a single trunk, from the left ventricle of the heart above its valves, and it serves to convey the mass of blood to all parts of the body.

APOCRYPHA, literally signifies *concealed, kept private*. The word was applied by the Jews to such of their books as were not published. At present, the apocrypha is a collection of writings that are placed at the end of the Old Testament, the sacred authority of which is not ascertained. They are regarded therefore, as books merely moral.

The Protestants do not only reckon those books to be apocryphal, which are esteemed such in the church of Rome, as the Prayer of Manasseh, king of Judah, the third and fourth book of Esdras, St. Barnabas's epistle, the book of Hermas, the addition at the end of Job, and the 151st Psalm; but also Tobit, Judith, Esther, the book of Wisdom, Jesus the son of Sirach, Baruch the prophet, the Song of the Three Children, the history of Susanna, the history of Bel and the Dragon, and the first and second book of Maccabees. It is not pretended that these books were received by the Jews, or so much as known to them. None of the writers of the New Testament cite or mention them: neither Philo nor Josephus speak of them. The Christian church was for some ages an utter stranger to these books. Origen, Athanasius, Hilary, Cyril of Jerusalem, and all the orthodox writers, who have given catalogues of the canonical books of Scripture, unanimously concur in rejecting these out of the canon. And for the New Testament they are divided in their opinions, whether the Epistle to the Hebrews, the Epistle of St. James, and the second Epistle of St. Peter, the second and third Epistles of St. John, the Epistle of St. Jude, and the Revelations, are to be acknowledged as canonical or not. The Protestants acknowledge such books of Scripture only to be canonical as were so esteemed to be in the first ages of the church.

APOCALYPSE, revelation, the name of one of the sacred books of the new testament, containing revelation or prophecies, with respect to the future state of the church and world. The apocalypse consists of 22 chapters; the three first are filled

with instructions to the bishops of the seven Churches of Asia-Minor; the 15 following ones describe the persecutions of the church; after these, the writer prophesies the vengeance that God will exercise against those persecutors. The four last chapters speak of the subsequent triumph and happiness of the church. Several other books have been published under the same title.

APODES, the name of one of the orders of fishes in the Linneean distribution of animals. Their leading character is, that they have no belly fins. There are 12 genera, among which is the eel tribe.

AROGEE, *Apogæum*, in astronomy, that point in the orbit of the sun, moon, &c. which is farthest distant from the earth. It is at the extremity of the line of the apsides; and the point opposite to it is called the perigee, where the distance from the earth is the least.

The ancient astronomers, considering the earth as the centre of the system, chiefly regarded the apogee and perigee: but the moderns, placing the sun in the centre, change these terms for the aphelion and perihelion. The apogee of the sun, is the same thing as the aphelion of the earth; and the perigee of the sun is the same as the perihelion of the earth.

APOLOGUE, a poetical fiction, the purpose of which is the improvement of morals. Some writers are of opinion, that this term ought to be confined to that species of fable in which brute or inanimate things, as beasts or flowers, are made to speak; but this distinction, so far from being followed, is generally reversed. It is, in reality, more usual to give the name of apologue where human actors only are introduced.

APOSTACY, is the quitting any system of thinking or acting, good or bad: but the word is generally used, in a reproachful sense, of one who has changed his religious opinions. To guard against this it was enacted by statute, 9 and 10 W. 3, "That if any person educated in, or having made profession of the Christian religion, shall by writing, printing, teaching, or advised speaking, deny the Christian religion to be true, or the holy scriptures to be of divine authority, he shall upon the first offence be rendered incapable to hold any office or place of trust; and, for the second, be rendered incapable of bringing any action, or of being guardian, executor, legatee, or purchaser of lands, and shall suffer three years imprisonment without bail. To give room however for repentance, if within four months after the first conviction, the delinquent will in open court publicly renounce his error, he is discharged for that once from all disabilities.

APOSTLE, in the New Testament; a name given by way of eminence to twelve of the disciples of Jesus Christ, chosen by himself to preach his gospel, and spread it through all parts of the world. Apostle, literally signifies a person sent upon any mission. St. Paul is frequently called The Apostle, by way of eminence; and The Apostle of the Gentiles, by reason that his ministry was chiefly made use of, for the conversion of the Gentile world, as that of St. Peter was for the Jews, who is therefore stiled The Apostle of the Circumcision. The several apostles are usually represented with their respective badges or attributes: St. Peter, with the keys; St. Paul, with a sword; St. Andrew, with a cross or saltier; St. James, minor, with a fuller's pole;

St. John, with a cup, and winged serpent flying from it; St. Bartholomew, with a knife; St. Philip, with a long staff, whose upper end is formed into a cross; St. Thomas, with a lance; St. Matthew, with a hatchet; St. Matthias, with a battle-axe; St. James, major, with a pilgrim's staff, and a gourd-bottle; St. Simon, with a saw; and St. Jude, with a club.

APOSTROPHE, in rhetoric, a figure, whereby the orator, in an extraordinary commotion, turns his discourse from the audience, and directs it to some other person, present or absent, living or dead, or to inanimate nature. Thus Cicero, in his oration for Milo, addresses himself to the great patriots who had shed their blood for the public; and calls them to the defence of his client. So the same orator, in his first Catilinarian oration, directs himself to Jupiter, the protector of the city and empire, and beseeches him to repel the parricide, &c.

APOTHECARY, one who practises the art of pharmacy, or prepares and sells medicines. There are in this profession various degrees, as to employ and extent. Some do little more than make up medicines, according to the prescription of the dispensatory (compiled by the order of the College of Physicians, for their direction) and of those of particular physicians, besides visiting their patients. Others not only prepare almost all kinds of medicines, as well galenical as chemical, but likewise deal in drugs, with all which they supply their brethren in trade; and so become a sort of wholesale dealers, as well as apothecaries.

APOTHEOSIS, in antiquity, an heathen ceremony, whereby their emperors and great men were placed

among the gods. It was one of the doctrines of Pythagoras, which he had borrowed from the Chaldees, that virtuous persons, after their death, were raised into the order of the gods. And hence the ancients deified all the inventors of things useful to mankind, and who had done any important service to the commonwealth.

APPARENT conjunction of the planets, is when a right line, supposed to be drawn through their centres, passes through the eye of the spectator, and not through the centre of the earth. And, in general, the apparent conjunction of any objects, is when they appear, or are placed in the same right line with the eye.

Apparent Diameter of an object, is not the real length of that diameter, but the angle it subtends at the eye, or under which it appears. This angle diminishes as the distance increases; so that a small object at a small distance may have the same apparent diameter, as a much larger object at a greater distance, provided they subtend the same or equal angles at the eye. If the objects are parallel to each other, their real diameters are, in this case, proportional to their distances. The apparent diameter also varies with the position of the object; and of equal objects at equal distances, those which stand in a position most nearly perpendicular to the line of their direction from the observer, will appear to have the greatest diameter: our idea of the apparent magnitude generally varying nearly as the optic angle.

Apparent Motion, is either that motion which we perceive in a distant body that moves, the eye at the same time being either in motion or at rest;

or that motion which an object at rest seems to have while the eye itself only is in motion. The motions of bodies at a great distance though really moving equally, or passing over equal spaces in equal times, may appear to be very unequal and irregular to the eye; which can only judge of them by the mutation of the angle at the eye. And motions, to be equally visible, or appear equal, must be directly proportional to the distances of the objects moving. Again, very swift motions, as those of the luminaries, may not appear to be any motions at all, but like that of the hour-hand of a clock, on account of the great distance of the objects: and this will always happen, when the space actually passed over in one second of time, is less than about the 14000th part of its distance from the eye; for the hour-hand of a clock, and the stars about the earth, move at the rate of 15 seconds of a degree in one second of time, which is only the 18751 part of the radius or distance from the eye. On the other hand, it is possible for the motion of a body to be so swift, as not to appear any motion at all; as when through the whole space it describes there constantly appears a continued surface or solid as it were generated by the motion of the object, like as when any thing is whirled very swiftly round, describing a ring, &c.

APPEAL, in law, the removal of a cause from an inferior to a superior court or judge, when a person thinks himself aggrieved by the sentence of the inferior judge. Appeals lie from all the ordinary courts of justice to the House of Lords.

Appeal, in common law, denotes an accusation by a private subject against another for some heinous

crime; demanding punishment on account of the particular injury suffered, rather than for the offence against the public. The only crime against one's relation, for which an appeal can be brought, is that of killing him, by either murder or manslaughter. But this cannot be brought by every relation; but only by the wife for the death of her husband, or by the heir-male for the death of his ancestor; which heirship was also confined by an ordinance of Henry I. to the four nearest degrees of blood. It is given to the wife on account of the loss of her husband; therefore, if she marry again, before or pending her appeal, it is lost and gone; or, if she marry after judgment, she shall not demand execution. The heir, as was said, must also be heir-male; and such a one as was the next heir by the course of the common law at the time of the killing of the ancestor.

APPLICATION, in geometry, is used either for division, for applying one quantity to another, whose areas, but not figures, shall be the same; or, for transferring a given line into a circle, or other figure, so that its end shall be in the perimeter of the figure.

Application of one science to another, is the use made of the principles of the one in perfecting the other: as in the application of algebra and geometry to mechanics; of mechanics to geometry; of geometry and astronomy to geography; of geometry and algebra to natural philosophy.

APPRENTICE, a learner, pupil; or student. Among traders or manufacturers, an apprentice is one who, upon certain conditions, and particularly that of being instructed in his master's art or trade, engages

to serve his said master for a certain term of years. The following is the form of an indenture, or agreement:

“This indenture witnesseth, That A. B. son of E. F. doth put himself apprentice to C. D. to learn his art; and with him (after the manner of an apprentice) to serve from the day of the date of these presents, until the full end and term of seven years from thence next following, to be fully complete and ended. During which term, the said apprentice his said master faithfully shall serve, his secrets keep, his lawful commandments every where gladly do: he shall do no damage to his said master, nor see to be done of others, but that he to his power shall let [i. e. prevent]; or forthwith give warning to his said master of the same: he shall not waste the goods of his said master, nor lend them unlawfully to any: he shall not commit fornication, nor contract matrimony, within the said term: he shall not play at cards, dice, tables, or any other unlawful games, whereby his said master may have any loss: with his own goods or others, during the said term, without licence of his said master, he shall neither buy nor sell: he shall not haunt taverns or playhouses, nor absent himself from his said master's service day nor night unlawfully; but in all things as a faithful apprentice, he shall behave himself towards his said master, and all his, during the said term. And the said master, his said apprentice in the same art and mystery which he useth, by the best means that he can, shall teach and instruct, or cause to be taught and instructed, finding unto his said apprentice meat, drink, apparel, lodging, and all other necessaries, during the said

term. And to the true performance of all and every the said covenants and agreements either of the said parties binds himself unto the other by these presents. In witness whereof, the parties abovenamed to these indentures interchangeably have put their hands and seals the day of in the year of the reign of our sovereign Lord of the united kingdom of Great Britain and Ireland, king, &c. and in the year, &c.

This is the regular form in law of all Indentures of Apprenticeship; which must be stamped with the proper duty, as well as with a stamp proportionate to the premium paid, previous to being executed: when other stipulations are made, such as respecting cloathing, boarding, &c. a counter agreement, or bond is usually taken, particularly in indentures of the city of London, where the form is invariably as above.

APPROPRIATION, in canon law, the annexing of an ecclesiastical benefice to the proper and perpetual use of some religious house, bishopric, college, or spiritual person, to enjoy for ever; in the same way as impropriation is the annexing a benefice to the use of a lay person, or corporation; that which is an appropriation in the hands of religious persons, being usually called an impropriation in the hands of the laity. It is computed that there are in England 8845 impropriations.

APPULSE, in astronomy, the actual contact of two luminaries, according to some authors; but others describe it as their near approach to each other; so as to be seen, for instance, within the same telescope. The appulses of the planets to the fixed stars have always been very useful to astronomers

as serving to fix and determine the places of the former. The ancients, wanting an easy method of comparing the planets with the ecliptic, which is not visible, had scarce any other way of fixing their situations, but by observing their track among the fixed stars, and marking their appulses to some of those visible points.

APRIL, the fourth month of the year, according to European computation. The word is derived from the Latin *aprilis*, of *aperio*, I open; because in this month the leaves and blossoms open; and the frost, by which the earth is closed, retires. In this month the sun passes through the sign *Taurus*, or the bull: or, to speak more exactly, he enters this sign on the 20th of April, and remains in it till about the 20th of May.

APSES, in astronomy, are the two points in the orbits of planets, where they are at their greatest and least distance from the sun or the earth; the point at the greatest distance being called the higher apsis, and that at the nearest distance the lower apsis.

APTERA, in the Linnæan system, is the seventh order of insects, the distinguishing characteristic of which is, that the beings comprehended in it have no wings. This order includes all kinds of spiders, the lice of different animals, scorpions, crabs, &c.

AQUA-FORTIS: another name for the nitric acid. This name is applied to denote the common nitrous acid used by workmen.

AQUA-REGIA: another name for the nitro-muriatic acid.

AQUATINTA, a style of engraving, or rather etching, by which an effect is produced similar to that of a drawing in Indian ink. For the performance of

the mechanical part of this art, the principal thing necessary is the following powder: Take equal portions of asphaltum and fine transparent rosin, suppose two ounces, and pound them separately. Then, with a muslin sieve, the rim of which may be formed of part of a chip box of three or four inches diameter, alternately sift thin strata of asphaltum and rosin upon paper, till the powders are exhausted: then pass the mixture through the same sieve upon paper once or twice, so as to render the incorporation complete, and it will be fit for use: or according to some, powdered gum-sandarach alone will answer the purpose. The act of aquatinting is to be performed as follows: The outline being etched upon the plate in the usual manner, the ground is to be softened with a little grease, and then wiped clean with a soft rag, so as only to leave a dimness on the surface of the copper. The powder already described is now to be sifted upon the plate, and the latter, afterward, struck upon its edge, to the end that all the powder not detained by the grease may fall off. This done, the back of the plate is to be held with a hand-vice over a charcoal fire, or lamp, till it becomes so hot as to give pain if touched. The powder which adhered to the grease will now be fixed to the plate. The plate being suffered to cool, take turpentine varnish, mixed with ivory-black, and with this, by means of a hair pencil, cover all the lights, or parts, where it is intended that the paper shall be left perfectly white. The aquafortis is now to be used, as in common etching. Suffer it to remain on the plate five minutes for the lightest tint; after which pour it off, and set the plate on its edge to dry. Then,

with the varnish stop out the light shades, and proceed in the same manner for the several tints that are required, adding the deepest last, when all the fainter are completed and covered. On the fineness of the powder depends that variation in the grain of the tint which is observed in different prints, or in different parts of the same. In Paris, aquatinted designs are printed in colours; for which purpose, several plates must be used, on each of which only the parts that are of the same colour are to be etched.

AQUEDUCT, a conduit of water, is a construction of stone or timber, built on an uneven ground, to preserve the level of water, and convey it, by a canal, from one place to another. There are aqueducts under ground, and others raised above it supported by arches. The Romans were very magnificent in their aqueducts; they had some that extended 100 miles. Frontinus, a man of consular dignity, and who had the direction of the aqueducts under the emperor Nerva, tells us of nine that emptied themselves through 13,594 pipes, of an inch diameter. Vigenere has observed, that, in the space of 24 hours, Rome received from these aqueducts no less than 500,000 hogsheads of water. The three chief aqueducts now in being, are those of the Aqua Virginea, Aqua Felice, and Aqua Paulina.

ARABIA, a considerable country in Asia: it is bounded on the west by the Red Sea; the isthmus of Suez, Palestine, and Syria; on the north by the Euphrates, on the east by the gulf of Persia, and the sea; and on the south by the straits of Babel-mandel, and the sea. Europeans have divided this

country into three parts, named from their supposed qualities, viz. Arabia Deserta ; Arabia Petrea, and Arabia Felix. The inhabitants are denominated Arabs, though they are sometimes called " Ishmaelites " as descended from Ishmael, the son of Abraham : they are likewise called " Scenites," signifying people that live in tents: they are also denominated Saracens, and Bedouins, by which terms are understood robbers and wanderers. They derive their subsistence from their flocks, from hunting, and from what they acquire by plunder. They acknowledge no sovereign, but the emirs of their tribes, who are their natural princes, and to whom they pay obedience. They have also scheiks or chiefs, who are persons of an advanced age, whom they often consult, and whose advice they follow. As there are no fixed judges among the Arabs, these scheiks supply their places, and from their determination there is no appeal. The Arabs are Mahometans, and observe circumcision, ablution, &c. &c. Believing in the doctrine of predestination, misfortunes give them but little pain, and they derive but a small portion of pleasure from prosperity, they receive both from the hands of God, to whom they refer every event. They have no habitations but their tents, which, with their flocks, they transport from one country to another, and erect them in those places, where they find the greatest abundance of pasturage and water. They generally stop in vallies, taking always the precaution to place some of their tents on the summit of a neighbouring hill, to prevent their being surprized by different tribes, who are their enemies. Arabia enjoys the prospect of constant verdure, though most

of the trees shed their leaves, and the annual plants wither, and are reproduced, but the interval between the fall of the leaf in one year, and the reproduction of new leaves for the next is so short, that the change is hardly observable.

ARACK, ARRACK, or RACK, is said to be an Indian name for all spirituous liquors. What in Europe is called arack, is procured by distillation from a vegetable juice, called *toddy*, which flows by incision out of a cocoa-tree. The Goa-arack appears to be made from the toddy, and the Batavia-arack from rice and sugar. The manner of making the Goa-arack is this: a man provides himself with a number of earthen pots, resembling bird-bottles, and with these fastened to his girdle, or in any other tolerably comedious manner, he climbs up the trunk of the cocoa-tree. When he comes to the boughs, he takes out his knife, and, cutting off several of the small knots or buttons, he applies the mouths of the bottles to the wounds, fastening them with bandages. The next morning, he takes off the bottles, the greater part of which are generally filled; and empties the juice into a proper receptacle, where it is left to ferment. When the fermentation is over, and the liquor or wash is become a little tart, all the spirit that it will yield is drawn from it, by the process of distillation. It is remarkable that all savage nations with which we are acquainted, have found means to manufacture ardent spirits of some kind or other.

AREOMETER, an instrument wherewith to measure the density or gravity of fluids. The areometer, or water poise, is usually made of glass; consisting of a round hollow ball, which terminates in a long

slender neck, hermetically sealed at top : there being at first as much quicksilver put into it as will serve to balance, or keep it swimming in an erect position. The stem, or neck, is divided into degrees or parts, which are numbered, to shew, by the depth of its descent into any liquor, the lightness or density of it: for that fluid is heaviest in which it sinks least, and lightest in which it sinks deepest.

ARBITRATION, is where the parties, injuring and injured, submit all matters in dispute, concerning any personal chattles or personal wrong, to the judgment of two or more arbiters or arbitrators; who are to decide the controversy. If these do not agree, it is usual for another person to be called in as umpire, to whose sole judgment it is then referred; or frequently there is only one arbitrator originally appointed. The decision, in any of these cases, is called an award, and thereby the question is as fully determined, and the right transferred or settled, as it could have been by the agreement of the parties, or the judgment of a court of justice.

Arbitration, or Comparison of Exchange, in arithmetic, determines the method of remitting to, or drawing upon, foreign places, in such a manner as shall be most advantageous to the merchant.

Arbitration is either Simple or Compound.

Simple Arbitration respects three places only. Here by comparing the par of arbitration between a first and second place, and between the 1st, and a 3d, the rate between the 2d and 3d, is discovered; from whence a person can judge how to remit, or draw to the most advantage, and to determine what that advantage is.

Compound Arbitration respects the cases in

which the exchanges among three, four, or more places are concerned. A person who knows at what rate he can draw or remit directly, and also has advice of the course of exchange in foreign parts, may trace out a path for circulating his money, through more or fewer of such places, and also in such order as to make a benefit of, his skill and credit: and in this lies the great art of such negotiations. See EXCHANGE.

ARBOR DIANÆ, or Silver Tree, is the result of an experiment in chemistry, by which the branches and figure of a tree are represented by an amalgam of silver and mercury, which appear to vegetate in a very beautiful manner. Experiment. Take one part of silver, and with it saturate a certain portion of nitrous acid: this is to be diluted with 20 parts of clean water, and poured upon two parts of mercury. After a short time a crystallization will take place, in the shape of a tree, with its branches, &c.

ARCH, a concave building with a mold bent in form of a curve, erected to support some structure. Arches are either circular, elliptical or straight, as they are improperly called by workmen. Elliptical arches consist of a semi-ellipsis, and have commonly a key-stone and imposts, they are usually described by workmen on three centres. Straight arches are those used over doors and windows, and having plain straight edges, both upper and under, which are parallel, but both the ends and joints point towards a centre. The term arch is peculiarly used for the space, between the two piers of a bridge, for the passage of water, vessels, &c.

ARCHBISHOP, the highest dignity in the English

church. It is possessed by the two prelates of Canterbury and York. An archbishop consecrates the inferior diocesans, as those ordain priests and deacons. When invested with his dignity, he is said to be enthroned; a term which probably originated with that period of English history, in which the archbishop of Canterbury had some of the privileges of absolute royalty. At this day, the stile and title of archbishop of Canterbury is as follows: "JOHN, by divine providence, lord archbishop of Canterbury, primate of all England, and metropolitan:" and he is addressed, "your grace;" a form likewise observed toward the metropolitan of York, who is not, however, stiled a primate, and whose jurisdiction, though similar in nature, is considerably less extensive. The archbishop of Canterbury is the first peer of England, and ranks next to the royal family, having precedence of all the great officers of the crown: he claims, by custom, the office of crowning the king and queen. The archbishop of York takes the same precedence of the nobility and officers of state, with the exception of the lord chancellor.

As the district over which a bishop presides is called a diocese, so that under an archbishop, which includes many dioceses, is denominated a province; and thus, in ecclesiastical matters, all England is divided into two provinces. Each archbishop, in his province, exercises authority over the bishops and inferior clergy; and has the power of probates of wills, and of granting letters of administration, as each particular bishop has within his own peculiar diocese: thus the probate of the will of a person who has resided within the diocese

of London, may issue from the bishop of London, or from the archbishop of Canterbury, within whose province London is included. The archbishops have also power to grant licenses and dispensations in all cases formerly carried to the court of Rome; and accordingly issue special licenses to marry, to hold two livings, &c. They have likewise the several courts of ecclesiastical judicature; as court of arches, court of audience, prerogative court, and court of peculiars.

ARCHDEACON, an officer of the church, next in rank below a bishop. Every diocese has one, and the generality more. England contains sixty arch-deaconries. These are usually appointed by their diocesans; but their authority is independent. They visit the clergy, and have courts for the punishment of offenders by spiritual censures, and for hearing all other causes that fall within ecclesiastical cognisance.

ARCHERY, the use of the bow and arrow. Since the introduction of gunpowder, the arrow has ceased to be employed as an offensive weapon: but, in former times it was reckoned of the utmost importance to the military strength of this kingdom. The success of the English, at the battles of Cressy and Poitiers, has been attributed to the arrows shot from long-bows. On various occasions, the bowmen gained great victories without the least assistance from the men-at-arms. In the dreadful battle between the English and Scotch, fought at Hamilton in 1402, the rest of the English army were but spectators of the valour and victory of their archers; and a circumstance occurred which sufficiently proves the power of this instrument of death. The

earl of Douglas, enraged to see his men falling thick around him beneath showers of arrows, and trusting to the impenetrableness of his armour, the manufacturing of which, it is said, had employed three years, accompanied by about eighty lords, knights, and gentlemen, in complete armour, rushed forward, and attacked the English archers sword in hand: but the arrows of the latter were so sharp and strong, and discharged with so much force, that no armour could repel them. The earl, after receiving five wounds, was made a prisoner, and all his brave companions, who escaped death, shared his fate. In those days it was said, "The might of the realme of England standyth upon archers;" and this being the case, we cannot be surprised at the attention at that time paid by the government to archery. Among instances of this attention, of which the knowledge has reached us, it appears, that, in the year 1482, planting of yew trees in church-yards was encouraged: the branches of that tree making the best bows, and such bows bearing a high price. In saying, however, that yew-trees were encouraged in church-yards for this purpose, it is by no means intended to suggest, that this was the first reason of their introduction into those places (See *Yew*): the government only made use of a practice previously established. By the regulations prescribed in the statute-book for the practice of archery, it appears that those who had arrived at maturity, were prohibited from shooting at any mark that was not distant 220 yards. As an amusement, archery is still practised in Britain. There are several societies of archers in England, the chief of which are the *Woodmen of*

Arden, and the *Trophilites*. In Scotland, there is a *Royal Company of Archers*; the members of which annually shoot for prizes given by the king and several corporate towns.

ARCHITECT, a term compounded of two Greek words, and literally signifying a *principal workman*. By this name, we understand, professionally, a man whose capacity and knowledge render him worthy of being confided in by persons who wish to build: in a more general sense, we mean one who is skilful in the theory and practice of architecture. A good architect is not an ordinary man; for, without reckoning the general literature which he has acquired, as the *belles lettres*, history, &c. he should be a proficient in the art of designing, as the soul of all his productions; in the mathematics, as the only means of regulating the judgment, and guiding the hand in its different operations; in masonry, as the basis of all the manual part of building; in perspective, to be acquainted with the several points of sight, and the *plus-valeurs*, which he is obliged to give to the decorations loftily situated. He must join to these talents the natural gifts of sound understanding, taste, discernment, and imagination. On employing an architect, he is required to present a design, and an estimate of the expence at which that design can be carried into execution. A general complaint against architects is, that the sum is eventually found to exceed, in a considerable degree, the estimate which they have thus given. It is said, that in some parts of Greece there was a law, which obliged architects to finish their undertakings at their own charge, if the expence of the building exceeded the sum at which

they had fixed it; and the justice of such a law is obvious, when it is considered, that, owing to this species of chicanery, many edifices have remained unfinished and useless for want of money: or, being completed have caused the ruin of families. An architect ought not to be suffered to gain reputation by risking the destruction of his employers. It is no unusual thing for modern architects to publish designs of different kinds of buildings, which are a sort of guide to gentlemen and others in explaining their wishes when they set about building. We have seen a very beautiful work of this kind by Mr. James Randall, a young man of distinguished excellence in this art.

ARCHITECTURE, the science of building in an elegant and graceful manner. We speak of military architecture, as in the construction of fortifications; and of naval architecture, when we mean the building of ships; but, these exceptions apart, we always intend, by the term architecture, something very different from the mere art of building; and accordingly, an architect and a builder are persons of separate professions. Architecture is always an indulgence of taste: but taste has suggested to nations, unacquainted with each other, very dissimilar notions of beauty. There exist at present several styles of architecture, that appear to be radically distinct from each other. One style, though much varied, presents itself in India, Africa, and the ancient fabrics of Europe: but between the architecture of Hindostan and that of China no affinity is discoverable: and still less does that of Greece bear any comparison with the rest. Respecting the origin of this latter, which is that at present admired in Europe, history carries us no

farther than to that period (itself remote) when Egypt was the seat of empire and of arts; and even there, the information is so obscure, that we can by no means decide upon the degree of excellence to which it was at that time carried, but are forced to allow to Greece a considerable share of the praise that we bestowed upon the art of which she undoubtedly learned the rudiments, at least, in Egypt. Rome, the next heir of civil glory, studiously copied the merits of her parent; and, from Rome, all Europe has in this, as in most other instances, received its lessons. To Greece we are indebted for the three principal orders of architecture, the Doric, the Ionic, and the Corinthian; Rome added two others, both formed out of the former, the Tuscan and the Composite. Each of these has a particular expression; so that a building, or different parts of a building, may be rude, solid, neat, delicate, or gay, accordingly as the Tuscan, the Doric, the Ionic, the Corinthian, or the Composite are employed. The columns of these several orders are easily distinguishable to common observers, by reason of the ornaments that are peculiar to their capitals; but the scientific difference consists in their proportions. We shall now proceed to describe these orders more particularly, observing that every order consists of three divisions, viz. the *pedestal*, the *column*, and the *entablature*. fig. 9. The *pedestal* consists of a base or plinth, the *clado* and the cornice, and it is used, in certain cases, to elevate the column to a necessary height. The *column* includes likewise a base, a shaft and a capital, and the *entablature* consists of an architrave, a frieze, and a cornice.

The plinth of a pedestal, takes its name from the

Greek, of a brick or flat stone on which columns in the early state of architecture are supposed to have stood. The dado, or, the die, as it is sometimes called from its cubical form, and the cornice takes its name from *corona*, top or summit.

The base of a column is its foundation; the shaft is comprehended between the capital and the base, and is so denominated from *caput*, the head; the abacus is the upper member of the column, and serves as a covering.

The architrave is so called from two Greek words signifying "principal beam," because the architrave is the chief support of the whole entablature. The frieze is a large flat face, which is sometimes enriched with figures. The cornice crowns the whole.

The parts of a complete order, excepting the dado and shaft, are composed of small members; as the *torus* or swell above the plinth: the *astragal*, a round member which terminates the extremities of the column: the *scotia*, a hollow moulding used in bases, so called on account of the strong shadow which its concavity produces.

The five orders already enumerated are distinguished from each other by the column with its base and capital, and by the entablature. To begin with the most simple: the *Tuscan*, fig. 10, is characterized by its simplicity and strength. It is devoid of all ornament. The *Doric*, fig. 11, is enlivened with ornaments in the frieze and capital. The *Ionic* fig. 12, is ornamented with the volute scroll, or spiral horn. Its ornaments are in a style of composition between the plainness of the *Doric*, and the richness of the *Corinthian*. The *Corinthian* order, fig. 13,

is known by its capital being adorned with two sorts of leaves ; between these rise little stalks, of which the volutes that support the highest part of the capital, are formed. The *Composite*, fig. 14. is nearly the same as the Corinthian, with an addition of the Ionic volute.

Each column has its particular base ; the Tuscan is the most simple, having only a torus, and plinth ; the Doric has an astragal more than the Tuscan. To the Ionic base the torus is larger, on a double scotia, with two astragals between. The Corinthian base has two toruses, two scotias, and two astragals. The Composite base has one astragal less than the Corinthian. See BALUSTERS, and also GOTHIC ARCHITECTURE.

ARCHITRAVES. See ARCHITECTURE.

ARGILS. See ALUMINE.

ARCHIVES, ancient records, or charters which contain titles, pretensions, privileges, and prerogatives of a family, city, or kingdom.

ARCHON, a Greek word, which literally signifies a commander. This word is applied by some authors to divers offices, both civil and religious, in the eastern or the Grecian empire. But it is more generally confined to the chief magistrate of the city and commonwealth of Athens. After the Athenians had abolished monarchy, they created archons, who were obliged to render an account of their administration to the people. These were at first chosen for life, and made hereditary : but a perpetual magistracy seemed to this free people too lively an image of royalty ; they therefore reduced the term of an archon's administration to ten years, and ere long to one year. There were nine archons, one of

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1. The first step in the process is to identify the problem or issue that needs to be addressed. This involves gathering information and understanding the context of the problem.

2. Once the problem is identified, the next step is to define the objectives and goals of the project. This helps to clarify what needs to be achieved and provides a clear direction for the team.

3. The third step is to develop a plan or strategy to address the problem. This involves breaking down the problem into smaller, manageable tasks and determining the resources needed to complete them.

4. The fourth step is to implement the plan. This involves putting the strategy into action and monitoring progress to ensure that the project is on track.

5. The final step is to evaluate the results of the project. This involves assessing the outcomes against the objectives and goals and identifying any lessons learned for future projects.

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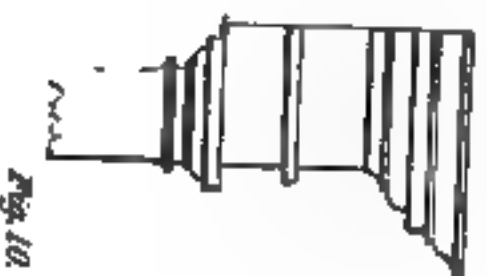
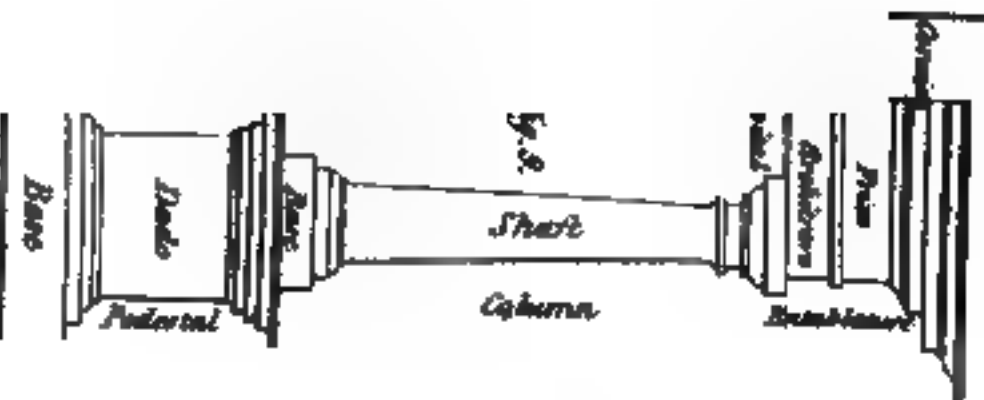
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1. The first group of respondents (10%) was made up of people who had been in the military for 10 years or less. The second group (20%) was made up of people who had been in the military for 11 to 20 years. The third group (30%) was made up of people who had been in the military for 21 to 30 years. The fourth group (20%) was made up of people who had been in the military for 31 to 40 years. The fifth group (20%) was made up of people who had been in the military for 41 years or more.

1. The first step in the process is to identify the problem. This involves gathering information about the situation and the people involved.

The following information was obtained from the records of the [redacted] Department of the Interior, Bureau of Land Management, regarding the [redacted] National Forest, [redacted] State of [redacted].

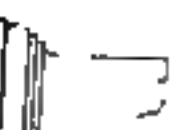
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Column.



Door.





whom, called Polemarch, was minister of war, but nothing more: they were all debarred from commanding the armies of the republic. Thus their charge was only an honorary function, so little calculated to excite the envy of the people, that they never aspired eagerly after this dignity, from which they were excluded by the laws of Solon.

ARCHIPELAGO, a sea interrupted by a great number of islands. Thus the word denotes a considerable part of the Mediterranean sea, having Romania in the north: Natolia on the east, Macedonia, Livadia, and the Morea on the west, and the isle of Candia on the south. It is partly in Europe and partly in Asia, containing the islands of Rhodes, Negropont, Lemnos, Samos, Patmos, &c.

ARCTIC. Northern; lying under the arctos, or bear. In astronomy, the arctic or north pole, is that which is raised above our horizon, and is nearly pointed out by the last star in the tail of Ursa minor. The arctic circle is a less circle of the sphere parallel to the equator, and distant $23^{\circ} 28'$ from the north pole. This and the antarctic are often called polar circles, and may be conceived to be described by the motion of the poles of the ecliptic round those of the equator.

AREA. See MENSURATION.

AREOMETER. See HYDROMETER.

AREOPAGUS, or **ARÆOPAGUS**, a sovereign tribunal at Athens, famous for the justice and impartiality of its decrees, to which the gods themselves are said to have submitted their differences. It was in the town, on a rock or hill opposite to the citadel. The word signifies strictly, rock of Mars; Mr.

Spon, when at Athens, found some remains of the areopagus still existing in the middle of the temple of Theseus, which was heretofore in the middle of the city, but is now without the walls. The foundation of the areopagus is a semicircle, with an esplanade of 140 paces round it, which properly made the hall of the areopagus. There is a tribunal cut in the middle of a rock, with seats on each side of it, where the areopagites sat, exposed to the open air.

ARETHUSA, in mythology, the daughter of Oceanus and one of Diana's attendants. As she was returned one day from hunting, she sat near the Alpheus, and bathed in the stream. The god of the river was enamoured with her, and pursued her over the country, when Arethusa offered up her prayers to Diana for protection, who changed her into a fountain.

ARGENT, silver in heraldry, the metal of which all white fields or charges are supposed to consist. Argent of itself is used to signify purity, innocence, beauty and gentleness.

ARGENTUM. Silver. Of a whitish colour not tarnished by the air, hard and tenacious, sonorous, exceedingly malleable, and ductile, specific gravity before hammering 10·478: melting when perfectly red hot, and its brilliancy much increased. Soluble in nitric acid; giving no colour to the solution, and capable of being precipitated from it by copper, iron, or zinc. See **SILVER**.

ARGO, in antiquity, a ship or vessel celebrated among the poets; being that wherein the Argonauts, of whom Jason was the chief, made their expedition in quest of the golden fleece. Sir Isaac

Newton thinks that this expedition was really an embassy sent by the Greeks, during the intestine divisions of Egypt, in the reign of Amenophis, to persuade the nations upon the coasts of the Euxine and Mediterranean seas to take that opportunity of shaking off the yoke of Egypt, which Sesostrius had laid upon them: and that fetching the golden fleece was only a pretence to cover their true design.

ARGONAUTA, a curious shell fish, of which there are several species, the Argonauta Nautilus inhabits the Mediterranean and Indian oceans, and was supposed in former ages to have taught mankind the first use of sails. When the little animal means to sail, it discharges a quantity of water, by which it was made heavier than sea water, and rising to the surface erects its arms, and throws out a membrane between them; by this contrivance it is driven forwards like a vessel under sail, hanging two of its arms over the shell to serve as oars or a rudder.

ARGUS, in mythology, was said to have a hundred eyes, fifty of which were always open. Mercury cut off his head, and Juno, grieved at his death, to make him some amends turned him into a peacock, and scattered his hundred eyes about the tail of the bird.

ARIADNE, in mythology, daughter of Minos, king of Crete, fell in love with Theseus, who was shut up in the labyrinth to be devoured by the Minotaur. She gave him a clue of thread, by which he extricated himself from the different windings of his confinement. He escaped and married Ariadne, and then deserted her, which so affected her mind

that she hanged herself. Bacchus had given her a crown of seven stars, which after her death was made into a constellation.

ARIANS, professors of those religious opinions which are comprehended under the term *arianism*, or the doctrines of Arius, a presbyter of the church of Alexandria in the fourth century. Arius denied the consubstantiality, that is to say, the sameness of the substance of the Son with the Father, in the trinity, and pretended that the Son was a mere creature produced in the course of time. The Arians allow that the Son is the Word; but maintain that the Word did not exist externally: they allow it only a priority of existence to all other creatures. They advance, moreover, that Christ had nothing human in his composition, except his body, in which the Word was rendered visible, that Word operating in Christ as the soul does in ourselves. * The Arian, therefore, appears to differ from the Socinian in this: that, whereas the latter supposes Jesus to have been a natural man, acting under the supernatural direction of the Deity, while the former considers the same person as a human form, filled with a superior spirit. The Arian differs, consequently, from the Trinitarian less than the Socinian, in as much as he denies only the *equality* of the second person.

ARIES, a constellation of fixed stars in the Ram. It is the first of the 12 signs in the zodiac, and consists of 66 stars.

ARISTOCRACY, an hereditary government, composed of the nobles, or superior citizens of a country: such was the government of Venice.

ARISTOTELIANS. See **PERIPATETICS**.

ARITHMETIC is the science of numbers, and it teaches the method of computing by them. The Greeks made use of the letters of their alphabet to represent their numbers. The Romans followed the same method, and besides characters for each rank of classes, they introduced others for five, fifty, five hundred, &c. As for example

One. Five. Ten. Fifty. One hundred.

I V X L C

Five hundred. A thousand.

D

M

Now it is evident that with these seven letters any number may be represented, by repetition and combination, thus XXX stand for three tens or thirty : CCX for two hundred and ten, and so on.

The general rule with regard to the addition and subtraction of these letters is this : when a numeral letter is placed *after*, or on the right hand of one of greater value, their values are to be added, thus XVI stand for sixteen, and MDCCCXI for the date of the present year 1811. But when a numeral letter is placed *before*, or on the left hand of one of greater value, the value of the less is taken from that of the greater, thus IV stand for five less one, or four : XC one hundred less ten, or ninety.

The method of notation that we now use is said to be taken from the Arabians, and the characters by which all the operations of common arithmetic are performed are these, 1, 2, 3, 4, 5, 6, 7, 8, 9, 0. The first nine are called significant figures, which when placed singly denote the simple numbers subjoined to the characters ; but when several significant numbers are placed together the first or right hand figure only is to be taken

for its simple value: the second signifies so many tens, the third so many hundreds, and so on: thus in the number 55555 the right hand figure stands for five only; the next stands for fifty; the third for five hundred; the fourth for five thousand, and the fifth for fifty thousand, and so on. The cypher in any place denotes the want of a number in that place, thus 60 denote six tens, and no simple number; 503 denote five hundred and three, there being no significant figure in the ten's place.

The whole art of arithmetic is comprehended in various modifications of the four rules, Addition; Subtraction; Multiplication; and Division. In each of these rules we shall give an example or two, and refer the reader to any of the common school books for farther illustrations and examples: that by Joyce is the most simple and best adapted for learners, and that by Bonycastle, is particularly useful to teachers as giving explanations of the theory and principles on which the science is founded.

Addition is the operation by which several numbers or sums are collected into one total:

	£.	£.	s.	d.
Examples	487	54	14	6 $\frac{1}{2}$
	395	39	19	0 $\frac{3}{4}$
	648	99	0	11 $\frac{1}{2}$
	422	5	5	4
	<hr/>			
Total	1962	£ 198	19	10 $\frac{1}{4}$
	<hr/>			

Subtraction is the operation by which we take a

less number, or sum, from a greater, to find their difference :

Examples.

lb.	£.	s.	d.
5764	875	6	9½
3982	493	12	4¼

Difference 1782 £. 381 14 4¼

Multiplication is a compendious mode of addition, and teacheth to find the amount of any given number by repeating it any proposed number of times :

Examples.

Cwt.	£.	s.	d.
4765	325	4	6¼ × 25 = 5 × 5
56			5
28590	1626	2	7¼
23825			5

Product 266840 £. 8130 13 0½

Division, teacheth to find how often one number is contained in another of the same denomination, and thereby performs the work of many subtractions :

Examples.

	£.	s.	d.
8)7649	4)874	16	3

Quotient. 956 — 1 £. 218 14 0¼

There have been various mechanical helps to the attainment of the early rules in arithmetic, we shall insert the following tables, with an explanation, which have been regarded as a sort of toy or puzzle.

(No. 1)	(No. 2)	(No. 3)	(No. 4)	(No. 5)	(No. 6)
1	2	4	8	16	32
3	3	5	9	17	33
5	6	6	10	18	34
7	7	7	11	19	35
9	10	12	12	20	36
11	11	13	13	21	37
13	14	14	14	22	38
15	15	15	15	23	39
17	18	20	24	24	40
19	19	21	25	25	41
21	22	22	26	26	42
23	23	23	27	27	43
25	26	28	28	28	44
27	27	29	29	29	45
29	30	30	30	30	46
31	31	31	31	31	47
33	34	36	40	48	48
35	35	37	41	49	49
37	38	38	42	50	50
39	39	39	43	51	51
41	42	44	44	52	52
43	43	45	45	53	53
45	46	46	46	54	54
47	47	47	47	55	55
49	50	52	56	56	56
51	51	53	57	57	57
53	54	54	58	58	58
55	55	55	59	59	59
57	58	60	60	60	60
59	59	61	61	61	61
61	62	62	62	62	62
(No. 1)	(No. 2)	(No. 3)	(No. 4)	(No. 5)	(No. 6)

These columns of figures are to be written or pasted on slips of card-board, ivory, bone, &c ;

which are to be given into the hands of a person to fix upon a number, and having done so he returns the cards, and on which the number fixed on is found, and his friend tells him instantly, by addition what number he has selected; this is done by adding together the top figures on the cards returned.

Examples. (1.) Suppose he fix on 18, then he will return the cards, No. 2, and 5, because 18 will be found on those only, and the top figures of those cards are 2 and 16, which added together give 18.

(2.) Suppose he fix on 41, then he will return No. 1, 4 and 6, and the top figures in these are 1, 8 and 32 = 41.

(3.) Suppose he fix on 58, then he will return No. 2, 4, 5 and 6, and the upper figures on these are 2, 8, 16, 32 = 58.

For subtraction, the method is equally obvious; and in this case, the cards are to be returned which have *not* the number, and the upper figures added together and their sum subtracted from 63 (which is the sum of the top figures on all the cards) will give the number fixed on.

Examples. (1.) Suppose a person fix on 41, as above, then for an exercise in subtraction he will return the cards, No. 2, 3 and 5, the top figures of which are 2, 4, 16 = 22, and 22 taken from 63 leave 41.

(2.) Suppose he fix on 51, then he will return No. 3 and 4, the top figures of these are 4 and 8 = 12, and 12 from 63 gives 51, and so of all other numbers.

ARMADA, a Spanish term, signifying a fleet of men-of-war. The armada, which was called by the proud Spaniards *invincible*, and which was in-

tended to destroy the liberties of this country, during the reign of the illustrious Elizabeth, was scattered by the elements and almost annihilated by the English fleet, on the 30th July 1588. On which occasion a medal was struck with the motto, —“*Afflavit Deus, et dissipantur,*”—in grateful memory of the interposition of Heaven in our favour.

ARMILLARY SPHERE, an artificial sphere composed of a number of circles put together in their natural order to assist the imagination in conceiving of the motions of the celestial bodies. This sphere revolves on its axis with a silvered horizon, which is divided into degrees, and moveable every way upon a brass supporter. The other parts are the equinoctial, zodiac, meridian, tropic and polar circles.

ARMINIANS, followers of Arminius, a sect of Christians which arose in Holland, about the beginning of the 17th century, and separated themselves from the Calvinists. The tenet of Arminius, which expresses, that the predestination of the Almighty relating to the salvation of mankind, consisted simply in a decree to justify and save the believers in Christ, they are said to have abandoned; Episcopus having taught that God makes choice of the faithful, not by predestination, but according to their actual belief. They consider the doctrine of the trinity as unessential to salvation; and the worship of the holy spirit as unordained by any precept of the scriptures. Their great principle is, that all sects of christians ought to be tolerated; because, say they, it has never yet been decided, which it is that has embraced the truest religion, and most conformable to the word of God.

ARMS, or ARMORIAL BEARINGS. See **HERALDRY**.

ARMONICA. See **HARMONICA.**

ARMOUR, a defensive habit, wherewith to cover and secure the body, from the effects of any offensive weapon. In ancient statutes this is frequently called harness. A complete armour anciently consisted of a casque or helm, a gorget, cuirass, gauntlets, tasses, brassets, cuishes, and covers for the legs, to which the spurs were fastened. This they called armour cap-a-pie; and was worn by cavaliers and men at arms. The infantry had only part of it, viz. a pot or head-piece, a cuirass and tasses; but all of them made light. Lastly, the horses themselves had their armour, wherewith to cover the head and neck. Of all this furniture of war, scarcely any thing is now retained except the cuirass; the gorget or neck-piece, worn by officers, being at present only a badge of honour and of no defence.

AROMA, that principle in plants, to which they owe their smell.

ARRAIGNMENT, in law, the arraigning or setting a thing in order, as a person is said to arraign a writ of *novel disseisin*, who prepares and fits it for trial. The term is most properly used to call a person to answer in form of law upon an indictment, &c. When brought to the bar, the criminal is called upon by name to hold up his hand; which, though it may seem a trifling circumstance, yet it is of this importance, that by holding up of his hand 'constat de persona,' and he owns himself to be of that name by which he is called. However, it is not an indispensable ceremony; for, being calculated merely for the purpose of identifying the person, any other acknowledgment will answer the purpose.

as well : therefore, if the prisoner obstinately and contemptuously refuses to hold up his hand, but confesses he is the person named, it is fully sufficient. Then the indictment is to be read to him distinctly in the English tongue (which was law, even while all other proceedings were in Latin,) that he may fully understand his charge. After which it is to be demanded of him, whether he be guilty of the crime whereof he stands indicted, or not guilty ? When a criminal is arraigned, he either stands mute, or confesses the fact, or else he pleads to the indictment.—1. If he says nothing, the court ought ‘*ex officio*’ to impanel a jury to enquire, whether he stands obstinately mute, or whether he be dumb ‘*ex visitatione Dei*.’ If the latter appears to be the case, the judges of the court (who are to be of counsel for the prisoner, and to see that he hath law and justice) shall proceed to the trial, and examine all points as if he had pleaded not guilty. But whether judgment of death can be given against such a prisoner, who hath never pleaded, and can say nothing in arrest of judgment, is a point yet undetermined.—If he be found to be obstinately mute (which a prisoner hath been held to be that had cut out his own tongue,) then if he be on an indictment of high treason, it hath long been clearly settled, that standing mute is equivalent to a conviction, and he shall receive the same judgment and execution.—The English judgment of penance for standing mute was, till of late years, a species of torture, effected by loading the body of the prisoner with heavy weights, till a plea of some kind was drawn from him; but the doubts entertained as to its legality, and the repugnance of its

theory to the humanity of the laws of England, concurred to require a legislative abolition of this cruel process, and a restitution of the ancient common law; whereby the standing mute in felony, as well as in treason and in trespass, amounted to a confession of the charge.—2. If the prisoner make a simple and plain confession, the court hath nothing to do, but to award judgment: but it is usually very backward in receiving, and recording such confession, out of tenderness to the life of the subject; and will generally advise the prisoner to retract it, and,—3. Plead to the indictment, in order that he may be tried.

ARREST, in common law, the apprehending or restraining of one's person, in execution of the command of some court, or officer of justice. The word arrest is French, and is used in that language for a decree or determination of a cause debated to and fro: in which sense it seems derived from *placitum*, the pleasure of the court. Hence, when a person is legally stopped, apprehended, and restrained of his liberty, for debt, &c. he is said to be arrested, or put under an arrest; which is the beginning of imprisonment. None shall be arrested for debt, trespass, &c. or other cause of action, but by virtue of a precept or commandment out of some court: but for treason, felony, or breach of the peace, a man may arrest without precept or warrant.

Arrest of Judgment, in law, the assigning just reason, why judgment should not pass; as, want of notice of the trial; a material defect in the pleading; when the record differs from the deed impleaded; when persons are misnamed; where more

is given by the verdict than is laid in the declaration, &c. This may be done either in criminal or civil cases.

ARROW, a light shaft, or rod, pointed at one end, and feathered at the other, intended as a weapon of offence. See *Archery*. Arrow-makers were called *fletchers* (from *flèche*, the French word for *arrow*), and thus has originated an English surname.

ARSENIC, one of the brittle metals, is a most active and dangerous poison, but is nevertheless used, in very small quantities, as a valuable medicine. If a quantity is swallowed large enough to endanger life, let an emetic be instantly given, and then large quantities of *hepar sulphuris* dissolved in water be taken: this, a scruple at a time, given with emetics, milk, castor oil, &c. may prevent the dire effects that would otherwise follow the dose of poison. See **CHEMISTRY**.

ARSON, is house burning, and burning the house of another is felony. If a servant through carelessness, shall set fire to a house, he or she shall forfeit 100*l.*, or be committed to hard labour in prison for 18 months.

ART and PART, a phrase used in Scotland: when any one is charged with a crime, they say, he is *art and part*, in committing the same, that is, he was concerned both in the contrivance and execution of it.

ARTERY, a blood vessel, which proceeds from the heart, and gradually becomes less in diameter, the farther it goes; but it gives out numberless ramifications in its course. Arteries carry the blood from the heart, to every part of the body, for the preservation of life, for nutrition, generation of heat, and the secre-

tion of the different fluids. The action of the arteries, called the pulse, corresponds with that of the heart.

ARTICLE, in grammar, a particle in most languages, that serves to express the cases and genders of nouns. *The* is a definite article in English and *a* the indefinite article.

ARTILLERY, a French term, originally applied to *archery*, but, since the introduction of gunpowder, used for cannon, and all military stores connected with those engines of war.

ARTILLERY COMPANY, originally a company of archers; a regiment consisting of four battalions, whose line of service is that of working mortars, and all pieces of ordnance, springing mines, &c. also a band of infantry of 600 men, making part of the militia, or city-guard of London: anciently, the artillery-company was a band of *archers*.

ARTILLERY FLYING, a modern invention, of the utmost value in the operations of war. A small cannon, as a six pounder, is slung between two horses; and these tractable animals are accustomed by practice, to stand while the piece is discharged between their heads. Beside the originality of the thought, the merit of this contrivance consists in the disposition of the leathern gear, by which the horses are saved from the shock attendant upon the recoil of the cannon. The great utility of this invention is obvious. The heavy artillery has always been an extreme incumbrance: upon the march of an army; to bring it to the place of an action, is a work of time, as well as labour; and in case of precipitate retreat, it can seldom be carried away: the *flying artillery* keeps pace with the most rapid

march of the troops ; can be galloped from one part of the field to another ; and, being harnessed during the whole action, retires as swiftly as the cavalry itself. It is said to have been the invention of a professor in the university of Edinburgh.

ARUNDELIAN MARBLES, called also the **Parian Chronicle**, are ancient stones, on which is inscribed a chronicle of the city of Athens, supposed to have been engraven in capital letters, in the island of Paros, 264 years before Christ. They take their name from the earl of Arundel, who procured them from the east, or from his grandson, who presented them to the University of Oxford. The authenticity of these marbles has led to a controversy between Mr. Robertson, who in his *Parian Chronicle* questioned it, and Mr. Hewlett, who defended it in a *Vindication of the Authenticity of the Parian Chronicle*.

AS, a weight used by the ancients, consisting of 12 ounces : it was also used as a coin, and as an integer divided into 12 parts.

Ascension, Right, of the sun, or of a star, is that degree of the equinoctial, accounted from the beginning of Aries, which rises with them, in a right sphere.—**Or, Right Ascension** is that point of the equinoctial, counted as before, which comes to the meridian with the sun or star, or other point of the heavens. And the reason of thus referring it to the meridian, is, because this is always at right angles to the equinoctial ; whereas the horizon is so only, in a right or direct sphere.

Ascension, Oblique, is an arc of the equator intercepted between the first point of Aries, and that point of the equator which rises together with

the star, &c. in an oblique sphere.—The Oblique Ascension is counted from the west to east; and is greater or less, according to the various obliquity of the sphere.

ASCENSIONAL Difference, is the difference between the right and oblique ascension of the same point on the surface of the sphere.

ASIA, the most extensive, the most anciently civilized, and, perhaps, the finest quarter, or grand division, of the globe. It lies under all latitudes; the Greater Tartary forming part of the northernmost region of the Russian empire, and the large island of New Holland, extending farther toward the south pole than the corresponding extremities of either Africa or America. Mankind, in this part of the world, have a very peculiar character, deducible from the primitive establishment of patriarchal or parental authority.

This vast country lies to the eastward of Europe, commencing at the isthmus of Suez, divided from Africa by the Red Sea, and extending on the side of the ocean to the Frozen Sea. The continent, in a political point of view, may be divided into six parts, 1. Turkey; 2. Asiatic Turkey; 3. Arabia; 4. Persia; 5. India; and 6. China: the islands are innumerable.

Great Tartary occupies more than half Asia, and makes part of the Russian empire. Through the greater part of its extent, it is uncultivated and a desert. The northern part is covered with forests abounding with white bears, ermines, and martins, the peltry of which forms the staple commerce of the country. It is called Great Tartary, to distinguish it from the Lesser, which is in Europe.

Great Tartary is itself divided into three districts, known by the additional names of Russian, Chinese, and Independent. Russian Tartary, also called Asiatic Russia, is separated into three governments, which take the name of their several capitals, Astracan, Casan, and Tobolski or Siberia. This latter forms the northern part of Asia, and runs along the northern sea. The coldness of its climate is extreme; but its soil is by no means so desolate as is vulgarly supposed. Turkey in Asia comprehends five provinces. Arabia is an extensive peninsula, distinguished into three parts: Petrea, or the Stony; Deserta, or the Desert; and Felix, or the Happy. The capital of Persia is Ispahan, one of the largest and finest cities in the world. In it are assembled the most admirable productions of Asia and Europe; and its streets are crowded with merchants of all nations and religions, drawn thither by its extensive commerce. India contains four principal countries: 1. The Mogul Empire; 2. The Western Peninsula, on this side of the Ganges, in which the English have acquired an immense territory; 3. The Eastern Peninsula, beyond the Ganges; and, 4. The Islands of Sunda, called the East Indies. China is the largest, the richest, the most populous, the most peaceful, and the most flourishing empire in the world: alone, it contains more inhabitants than all Europe. Among the islands of Asia, there are vast empires, not to mention that of Japan, scarcely known to us but by name.

The most considerable rivers in this venerable portion of the globe, are the Obi, the Lena, and the Yenisei, which in the north, run from the southward into the Frozen-sea; the Ki-ang and the

Ho-ang, in the east; and the Tigris, the Euphrates, the Indus, and the Ganges in the south. Asia is traversed in the direction of west to east, by two principal chains of mountains: the first, Mount Taurus or Caucasus, and the second composed of Poyas Noss. It abounds with corn, wine, rice, and almost every species of delicious fruit; it exports perfumes, coffee, tea, spices, calicos, silks, painted linens, cloths of tree-bark, beautiful porcelain, and the diamonds, gold, silver, and copper of its mines. Its more peculiar animals are, the lion, tiger, elephant, rhinoceros, camel, crocodile, and tortoise. Mahometanism is the prevailing religion through all the interior of Asia; the rest, with the exception of the countries in which Europeans have established themselves, have not yet emerged from the rudeness of idolatry. All the sovereigns of this quarter of the globe reign with absolute authority; and are revered by their subjects; to inspire whom with respect, they maintain the innocent and commendable policy of being seldom seen.

ASPECT, in astronomy, denotes the situation of the planets and stars, with respect to each other. There are five different aspects. 1. Sextile aspect is when the planets or stars are 60° distant, and marked thus \ast . 2. The quartile, or quadrate, when they are 90° distant, marked \square . 3. Trine, when 120° distant, marked \triangle . 4. Opposition, when 180° distant, marked \oslash . And, 5. Conjunction, when both in the same degree, marked \odot . Kepler, who added eight new ones, defines aspect to be the angle formed by the rays of two stars, meeting on the earth, whereby their good or bad

influence is measured ; for it is to be observed, that these aspects being first introduced by astrologers, were distinguished into benign, malignant, and indifferent ; the quartile and opposition being accounted malign ; the trine and sextile, benign or friendly ; and the conjunction indifferent.

ASSASSIN, one who kills another, not in open combat, but privately, or suddenly. The name is generally restrained to murderers of princes or other political characters ; or, to speak perhaps more explicitly, to where the murder is committed from some sentiment of hatred, but in a private and dastardly manner. We do not call an ordinary murderer, who has nothing in view but plunder, an Assassin. Some attribute the origin of this word to a prince of the family of the *Arsacida*, or *Assassins*, who brought up a number of young men to the employment of murdering the princes with whom he was at enmity ; but M. Volney says, that in the vulgar Arabic, the word *Hassassin* signifies “Robbers of the night,” persons who “lie in ambush to kill ;” and is always understood in this sense in Cairo and in Syria.

ASSAYING, in metallurgy, or the docimastic art, is used to express those chemical operations which are made in small to ascertain the quantity of metal contained in ores, or to discover the value, or purity of any mass of gold, silver, or any other metal. This mode of examination differs from analysis in being principally concerned about only one of the ingredients in the ore, or alloy, whereas the object of the latter is to ascertain the quantity and proportion of every substance in the mass to which it is applied. Thus, in the assay of copper ores, the

object is to know the proportion of pure metallic copper which a given weight of the ore can be made to yield, disregarding all the other component parts, such as the sulphur, iron, silex, &c. or, rather, confounding them together under the general term impurities. Thus also in the assay of a mixture of gold, or of gold and silver, with copper, lead, tin, or any other of the inferior metals, the whole attention is directed to the proportion of fine, or of gold and silver contained in the alloy.

ASSAY-MASTER, an officer, under certain corporations, entrusted with the care of making true touch, or assay, of the gold and silver brought to him; and giving a just report of the goodness or badness thereof. Such is the assay-master of the mint in the Tower, called also assayer of the king. The assay-master of the goldsmiths' company is a sort of assistant-warden, called also a touch-warden, appointed to survey, assay, and mark all the silver work, &c. committed to him.

ASSETS, in trade, signifies goods or property enough to answer all demands made upon them.

ASSIGNMENT, in law, the act of assigning or transferring the interest or property a man has in a thing; or of appointing and setting over a right to another. Bills of Exchange are assigned over by indorsement.

ASSIMILATION, is that process in animal economy by which the different ingredients of the blood are made parts of the various organs of the body: thus the stomach converts the food into chyme; the intestines change the chyme into chyle, and the blood vessels convert the chyle into blood. The healing of every fractured bone, and of every

wound in the body, is a proof of the existence, and an instance of the action of assimilation.

Assize, a periodical court, held in the several districts of the united kingdom of Great Britain and Ireland, for the decision of all writs and processes, whether civil or criminal, by judge and jury. An assize is a *sitting*, or session; and the other senses in which the word is used, apply to the results of such sitting, or session. Before assises or judges of assise, at least, were established, the business was done by the justices in eyre, who, in more early times, made their circuit once in seven years, but were directed by *Magna Charta*, to be sent into every county once a year, to try certain actions, the most difficult of which they were to return into the court of Common Pleas, to be there determined. At present, all the counties of England are divided into six circuits; and two judges, by the king's commission, are assigned to each, who hold their assises twice a year, except in the four northern counties, which they visit but once. The evils of septennial assises must have been dreadful; those of the yearly ones just mentioned are deplorable; and even half-yearly trials are a stigma on the British system of jurisprudence: for, setting humanity totally out of the question, prisons are but nurseries of crimes. The judges upon their circuits sit by five several authorities: 1. The commission of the peace, in each county; 2. That of *oyer and terminer* (*hearing and determining*), directed to them and many other gentlemen of the county, by which they are empowered to try treasons, felonies, &c. and this is the largest commission they have; 3. That of general gaol-delivery, directed to the judges and the

clerk of the assise associate, which gives them the power of trying every prisoner in the gaol, committed for any offence whatever, but none but prisoners in the gaol ; so that, one way or other, they rid the gaol of all the prisoners it contains ; 4. That of assise, directed to the judges and clerk of assise, to take assises, that is, to take the verdict of a peculiar species of jury called an assise, summoned for the trial of landed disputes. The other authority is, 5. That of *nisi prius*, which is a consequence of the commission of assise. All justices of peace are bound to be present at the assises, and sheriffs are also to give their attendance on the judges, on pain of fine.

ASSOCIATION of *ideas*, is where two or more ideas constantly and immediately follow one another in the mind, so that one shall almost infallibly produce the other, whether there be any natural relation between them or not. According to Dr. Hartley, particular sensations result from previous vibrations conveyed through the nerves to the medullary substance of the brain, and these are so intimately associated together, that any one of them, when impressed alone, shall be able to excite in the mind the ideas of all the rest. This author maintains that simple ideas run into complex ones by association.

ASSURANCE, see INSURANCE and LIFE *Annuities*.

ASSYRIA, a country of Asia, which formerly comprehended those provinces of Turkey and Persia, now named Diabekr, and Irac Arabia : it is bounded on the east by Media, on the west by Mesopotamia, north by Armenia, and south by Arabia.

ASTEROIDS, a name given by Dr. Herthel to the new planets, or four small planetary bodies, discovered by the foreign astronomers, Piazzi, Olbers, and Harding, which are defined as "celestial bodies either of little or considerable excentricity round the sun, the plane of which may be inclined to the ecliptic in any angle whatever. The motion may be direct or retrograde; and they may or may not have considerable atmospheres, very small comas, discs, or nuclei."

ASTROLABE, a stereographic projection of the sphere, either upon the plane of the equator, or upon that of the meridian; the eye, in the first construction, being supposed to be in the pole of the world, and in the second, in the point of the intersection of the equinoctial and horizon. **Astrolabe** is also the name of an instrument formerly used for the purposes now performed by the quadrant.

ASTROLOGER, a pursuit by means of which it is pretended to foretel future events, physical and moral, according to these separate objects of inquiry, Astrology is divided into two branches, called, respectively, *natural* and *judiciary*. To the former, belongs the prediction of physical occurrences; as storms, earthquakes, changes of the weather, &c. and to the latter, the foreknowledge of human actions and destinies, which, according to the visionary philosophers, or barefaced impostors, who profess it, are under the immediate influence of the stars.

ASTRONOMY, a research of a very different nature from that of Astrology, the subject of the preceding article. In every age and country, Astronomy has

engaged the attention of mankind : and who, indeed, can behold the "dread magnificence of heaven," a magnificence that continually increases on the eye that surveys it, without feeling the most earnest solicitude to learn every thing respecting it, that the powers of his mind can discover ? "I saw the stars," says the *Parisi* of *Saint-Pierre*, "I saw the stars rising from the east in endless succession ; and I felt that nature, who has linked the lot of man with so many invisible objects, has surely given him a relationship, to those that present themselves to his eyes !" And we are connected with this scene : from it we receive not only the sublimest, but the clearest conceptions of creation, and its Creator ! Nor does its vastness oppress us : let us watch the impression it makes, and observe whether it does not rather prompt us "to claim a kindred with the skies ?" What a melancholy thought would it be, did we look at the stars, and believe that they should continue to revolve through an eternity, after ourselves were lost in nothingness ! but this is not the spontaneous, and therefore not the instinctive, feeling of man. On the contrary, how natural, how congenial to the heart, is the exclamation of *Fingal* : "When thou, sun of heaven, shalt fail—if thou shalt fail, thou mighty light,—if thy brightness is for a season, like *Fingal*, our fame shall survive thy beams !"

He that has made himself acquainted with astronomical facts, is enabled to behold with the mind's eye, a prospect in which this our globe forms but a small part indeed ! and it is impossible to think justly, on these three great objects of all thought,—Man, the World, and the Deity,—without begin-

ning at this point. The low theology of the ancients, arose out of astronomical ignorance. To their eyes, the earth was a plane: beneath its surface were the abodes of the dead; above it, rose the vaulted skies, at once a canopy to men, and a flooring to the gods. The shining stars ornamented the heavens, as the flowers did the fields. Observe, the world was not a part, but the centre of a system: With some of the more metaphysical teachers, heavens were raised above heavens; and it must be allowed, that in proportion as his seat was raised, the idea entertained of the Supreme, became more abstract and sublime. Still, however, the sole object of divine solicitude was the world: the world was not a part, but the whole.

But what are our conceptions? Reclined upon the green surface of the earth, as a mariner upon the side of a vessel, we look at once into the ocean of universal space. We suppose this space unbounded; because, with the idea of boundaries we must connect that of something beyond those boundaries, and this can be nothing but a recommencement of space. We consider ourselves as resting upon a body which is continually turning round; and to which we adhere by the unalterable nature of matter. We reflect that if a bird, or a balloon, could rise to the height at which the attractive influence of the earth ceases, it must fall into the void. We reflect that, could we divest ourselves of matter, we should be released from that power by which we are chained to the earth: and having supposed this alteration, we may please ourselves with the thought of our liberty, or trembling, that as the world turns round we shall drop from it into the dark and chill

space that we conceive unbounded. From this reverie, let us turn to the view of creation: we are aware that the planet in which we live is surrounded by exhalations, or light particles of itself, which form what is called its atmosphere. This atmosphere, though light and fluid, is material, and compounded of the very elements that, in a compacted state, form the sod on which we tread. We perceive, then, that we are surrounded by matter. That, to us the viewless fluid, in which we breathe and move, is as absolutely a body as water, and as essential to our existence, as is water to that of fish. But this material atmosphere extends only to a certain distance round the surface of the earth. Beyond this, commences a space of the nature which we can give no account of, but which some philosophers have supposed a sea of ether, and in which we must conclude that neither animals nor plants can live. This is that space in which the stars are placed....

The stars are supposed to be centres of systems, that is, points, round which their attending planets revolve; suns, by whose power these planets are enlightened and warmed: and are not these stars, in their turn, but parts of still larger systems? Is there not a point round which they, with all their worlds, in harmonious order, revolve, and which is to them a sun?

Imagination, tutored by astronomy, might here place the abode of God. Beyond a doubt, there is a physical, a mechanical, centre of the universe: for surely the stars are upheld in heaven by the same law of attraction through which the planets are supported by the stars. Did a star cease to

attract its planets, they must fall till they come within the reach of the next attracting centre; and it is only by attraction that the stars themselves are retained in their quarters of the heavens. Imagine, then, all constellations revolving round one point: see them advance in splendid and solemn procession! and where, with more sublimity than in that commanding station, can the theologist place the all-disposing mind? Where can the poet and the painter, with more grandeur, place that throne before which universal nature is prostrate, and whence life and all its enjoyments are dispensed?

But whatever metaphysical creed we may adopt, we have, at least, obtained a comprehensive view of creation. We have ascertained the place and magnitude of a world that is and must be so very interesting to us; and we are enabled, by regular induction, to make some estimate of our own.

Such is the philosophical value of astronomy. Its great practical use is in navigation and geography: by their bearings with respect to the celestial bodies, the situation of places is described, and their relative distances determined. As a science, we have been taught by Newton to study it in the general laws of MATTER; to which article, with those of MOTION, ATTRACTION, and GRAVITATION, the reader is referred. For astronomical facts and descriptions, as of the EARTH, MOON, PLANETS, STARS, and SOLAR SYSTEM, &c. see the several subjects required.

ASYMPTOTE, is properly a right line, which approaches continually nearer and nearer to some curve, whose asymptote it is said to be, in such sort, that when they are both indefinitely produced, they

are nearer together than by any assignable finite distance; or it may be considered as a tangent to the curve when conceived to be produced to an infinite distance.

ATCIEVEMENT, or *Achievement*, in heraldry, denotes the arms of a person or family, together with all the exterior ornaments of the shield; as helmet, mantle, crest, scrolls, and motto, together with such quarterings as may have been acquired by alliances, all marshalled in regular order. See **HERALDRY**.

ATHEIST, one who denies the existence of a God. Perhaps no man, for any length of time, was a real atheist; he must have had feelings that advertised him of some being superior to what he sees. It will be said, indeed, that men have suffered persecution, and even martyrdom, in its cause: but martyrdom, though it proves the martyr's resolution; and, one would think, the firmness of his belief in the doctrine for which he resigns his life, is no argument for the truth of that doctrine. Perhaps there have been no real atheists but among speculative men: for the libertine, so long as his libertinism lasts, is in a state of continual intoxication: in his sober moments, he is no atheist. Speculative atheists are wanderers from the true paths of philosophy; and it is to be hoped, that there are few who do not soon perceive their mistake. It is probable, that at some period of their lives, most reflecting men have entertained ideas a little inclining to this unhappy point; and, if the conjecture be true, we may rest on it a consolatory hope; that, of those who profess atheism, not many continue long its votaries. It is not at all wonderful, nor ought the error to be denied indulgent discussion, if among the stratterers

in that philosophy which describes matter as acting upon matter by necessary laws, and thus producing necessary effects; some should be tempted to reject the existence of a primitive and preserving cause: especially, as in the pursuit of that philosophy the mind is accustomed to find every thing explained upon mechanical and comprehensible principles, while a distinct conception of a God exceeds the intellectual capacity of man. It is no argument, that the original professors of these doctrines were far from drawing any such conclusions. We know they were; but we know that all doctrines are perpetually misunderstood; and that the best have been made to do much mischief. Let those, however, who have been staggered by the considerations alluded to, remember, that, beyond all which mathematics or chemistry can discover, there is a something that as certainly exists as it defies inquiry. We may have traced the wheels of nature's machinery; but must there not have been a maker? We may have learned the laws of matter; but must there not have been a law-giver? We may have analyzed the component parts of matter, and reduced those parts into atoms; but, after all, what have we found that will supply the place of a Creator? It were more rational to believe that the majestic oak produces, of its own power and intelligence, its foliage and its fruit, than that atoms, of their power and intelligence, produced the majestic oak. Matter, then, must have had a Creator; and it is of little consequence to the fact, whether, in attracting and yielding to attraction, in assuming every modification, in combining into all forms, here an ocean, and there a flower; here an elephant,

and there a butterfly; it is of little consequence, whether it acts upon instinctive endowments, or is senseless, and obeys controlling laws: in either case, a superior power and intelligence are indispensable. This power and intelligence must have existed from all eternity; since, if it ever began to be, it must have had a cause capable of producing it; and thus, to whatever distance we push the perspective, a deity closes up the scene: it must exist eternally, unless that which produced all matter, can itself be annihilated, and the source of life expire.

But we have an evidence on this question, so strong, so authentic, as would justify us, were it necessary, in refusing credit to all the calculations of philosophy. That the human mind entertains an idea of a God, is a positive proof of his existence. Whence could such an idea arise? Whence, but from the contemplation of the objects around us? Was it not, is it not, communicated by the mysterious impression that nature is always capable of making upon us? Have not the mute fields impelled us, secretly, indeed, but irresistibly, to assert the being of an invisible power?

It has, however, been maintained, that this idea is not natural; that it is the effect of education; and that we believe it only because it has been repeated to us: now it happens, that we may admit even this proposition, false as it is, without any danger from the doctrine of atheism; for, as it is a fact that man has such an idea, if it be proved, that it is not natural, it can only follow that it is supernatural: and if it be called supernatural, the Deity is placed in full view at once. The atheist has accomplished nothing: he has only taken away from na-

tural religion a foundation, which some have been inclined to allow it, and, established, beyond a possibility of doubt, the truth of revelation.

ATHWART, in navigation, is synonymous with across the line of the course. Athwart the fore-foot, is a phrase that denotes the flight of a cannon ball from one ship across the course of another ; to intercept the latter, and oblige her to shorten sail, that the former may come near enough to examine her.

ATLANTIS (New,) is the name of a fictitious philosophical commonwealth, of which a description has been given by Lord Bacon. Its chief design is to exhibit a model of a college, instituted for the interpretation of nature and the production of great and marvellous works, for the benefit of men, under the name of Solomon's House, or, " the college of " the six day's work." Thus much, at least, is finished ; and with great beauty and magnificence. The author proposed also a frame of laws, or of the best state or mould of a commonwealth. But this part is not executed.

ATLAS, a king of Mauritania, said to have been contemporary with Moses, who took observations of the stars from a certain mountain. In process of time, the mountain was called by the name of the king ; the poets feigned a metamorphosis ; and as the " cloud-capt" mountain seemed to support the skies, Atlas was said to bear the heavens on his shoulders.

Atlas, a chain of mountains supposed to stretch across the whole continent of Africa, and deriving their name from Atlas the king.

Atlas, in allusion to the above circumstances, a book of universal geography.

Atlas, a silk-satin, manufactured in the East-Indies, plain, striped, or flowered, and inter-worked with gold. These are manufactured with an excellence beyond the reach of European art. In China, slips of gilded paper are wrought into the atlases, which, with little cost, gives them a very rich appearance.

Atlas, a denomination given to a large size of paper, such as atlases, or large maps, may be printed upon.

ATMOSPHERE is that invisible elastic fluid which surrounds the earth to an unknown height; and encloses it on all sides. This fluid is essential to the existence of all animal and vegetable life, and even to the constitution of all kinds of matter whatever, without which they would not be what they are: for by it we literally may be said to live, move, and have our being: by insinuating itself into all the pores of bodies, it becomes the great spring of almost all the mutations to which the chemist and philosopher are witnesses in the changes of bodies. Without the atmosphere no animal could exist; vegetation would cease, and there would be neither rain nor refreshing dews to moisten the face of the ground; and though the sun and stars might be seen as bright specks, yet there would be little enjoyment of light, could we ourselves exist without it. Nature indeed, and the constitutions and principles of matter would be totally changed if this fluid were wanting.

The mechanical force of the atmosphere is of great importance in the affairs of men, who employ it in the motion of their ships, in turning their mills, and in a thousand other ways connected with the arts of life.

With regard to the weight and pressure of the atmosphere, it is evident that the whole mass, in common with all other matter, must be endowed with weight and pressure: and it is found by undeniable experiments, that the pressure of the atmosphere sustains a column of quicksilver, in the tube of a barometer of about 30 inches in height; it accordingly follows, that the whole pressure of the atmosphere is equal to the weight of a column of quicksilver of an equal base, and 30 inches in height, or the weight of the atmosphere on every square inch of surface is equal to 15 pounds. It has moreover been found, that the pressure of the atmosphere balances in the case of pumps, &c. a column of water 34½ feet high; and the cubical feet of water weighing just 1000 ounces, or 62½ lbs., 82½ multiplied by 62½, or 2,156 lbs. will be the weight of a column of water, or of the atmosphere on the base of a square foot; and consequently the 144th part of this, or 15 lbs. is the weight of the atmosphere on a square inch. From these data, Mr. Cotes computed the pressure of the atmosphere on the whole surface of the earth to be equivalent to that of a globe of lead 60 miles in diameter. Dr. Vince and others have given the weight at 77,670,297,973,563,429 tons. This weight is however variable; it sometimes being much greater than at others. If the surface of a man, for instance, be equal to 14½ square feet, the pressure upon him, when the atmosphere is in its lightest state, is equal to 13½ tons, and when in the heaviest, it is about 14 tons and one-third; the difference of which is about 2,464 lbs. It is surprising that such weights should be able to be borne without

crushing the human frame ; this indeed would be the case, if all the parts of our body were not endowed with some elastic spring, whether of air or other fluid, sufficient to counterbalance the weight of the atmosphere. Whatever this spring is, it is certain that it is just able to counteract the weight of the atmosphere, and no more ; of course it must alter in its force as the density of the atmosphere varies : for if any considerable pressure be superadded to that of the air, as by going into deep water, it is always severely felt ; and if on the other hand, the pressure of the atmosphere be taken off from any part of the human body, by means of the apparatus belonging to the air-pump, the inconvenience is immediately perceived.

The difference in the weight of the atmosphere is very considerable, as has been observed, from the natural changes in the state of the air. These changes take place chiefly in countries at a distance from the equator. In Great Britain, for instance, the barometer varies from 28.4 to 30.7. On the increase of this natural weight, the weather is commonly clear and fine, and we feel ourselves alert and active ; but when the weight of the air diminishes, the weather is often bad, and we feel listlessness and inactivity. Hence invalids suffer in their health from very sudden changes in the atmosphere. In our observations on the barometer, we have known the mercury to vary a full inch, or even something more, in the course of a few hours. Such changes, however, are by no means frequent. Ascending to the tops of mountains, where the pressure of the air is very much diminished, the inconvenience is rarely felt, on account of the gra-

dual change; but when a person ascends in a balloon with great rapidity, he feels, we are told by Garnerin and other aeronauts, a difficulty of breathing, and many unpleasant sensations. So also, on the condensation of the air, we feel little or no alteration in ourselves, except when the variations are sudden in the state of the atmosphere, or by those who descend to great depths in a diving-bell. See DIVING-BELL.

Various attempts have been made to ascertain the height to which the atmosphere is extended all round the earth. These commenced soon after it was discovered by means of the Torricellian tube, that air is endued with weight and pressure. And had not the air an elastic power, but were it every where of the same density, from the surface of the earth to the extreme limit of the atmosphere, like water, which is equally dense at all depths, it would be a very easy matter to determine its height from its density and the column of mercury which it would counterbalance in the barometer tube: for, it having been observed that the weight of the atmosphere is equivalent to a column of 30 inches or $2\frac{1}{2}$ feet of quicksilver, and the density of the former to that of the latter, as 1 to 11040; therefore the height of the uniform atmosphere would be 11040 times $2\frac{1}{2}$ feet, that is 27,600 feet, or little more than 5 miles and a quarter. But the air by its elastic quality, expands and contracts; and it being found by repeated experiments in most nations of Europe, that the spaces it occupies, when compressed by different weights, are reciprocally proportional to those weights themselves; or that the more the air is pressed, so much the less space it takes up; it

follows that the air in the upper regions of the atmosphere must grow continually more and more rare, as it ascends higher; and indeed that, according to that law, it must necessarily be extended to an indefinite height. Now, if we suppose the height of the whole divided into innumerable equal parts, the quantity of each part will be as its density; and the weight of the whole incumbent atmosphere being also as its density; it follows, that the weight of the incumbent air is every where as the quantity contained in the subjacent part; which causes a difference between the weights of each contiguous parts of air.

The atmosphere, or air, has also a reflective power; and this power is the means by which objects are enlightened so uniformly on all sides. The want of this power would occasion a strange alteration in the appearance of things; the shadows of which would be so very dark, and their sides enlightened by the sun so very bright, that probably we could see no more of them than their bright halves; so that for a view of the other halves, we must turn them half round, or if immoveable, must wait till the sun could come round upon them. Such a pellucid unreflective atmosphere would indeed have been very commodious for astronomical observations on the course of the sun and planets among the fixed stars, visible by day as well as by night; but then such a sudden transition from darkness to light, and from light to darkness, immediately upon the rising and setting of the sun, without any twilight, and even upon turning to and from the sun at noon day, would have been very inconvenient and offensive to our eyes. However, though

the atmosphere is greatly assistant in the illumination of objects, yet it must also be observed that it stops a great deal of light.

ATOM, in philosophy, a particle of matter, so minute as to admit of no division. . . . Atoms are the *minima natura*, and are conceived as the first principles or component parts of all physical magnitude.

ATOMICAL PHILOSOPHY, or the doctrine of atoms, a system which, from the hypothesis that atoms are endued with gravity and motion, accounted for the origin and formation of things. This philosophy was first broached by Moschus, some time before the Trojan war: but being much cultivated and improved by Epicurus, is denominated the EPI-CUREAN philosophy, which see. . . .

ATROPA, deadly-nightshade, a remarkable species of which, the *Belladonna*, grows wild in Britain. It has a perennial root, which sends out strong herbaceous stalks of a purplish colour, rising to the height of four or five feet, garnished with entire oblong leaves, towards autumn, that changes to a purplish colour. The flowers are large, and come out singly between the leaves, upon long footstalks, bell-shaped, and of a dusky colour on the outside, but purplish within. After the flower is past, the germen becomes a large round berry, a little flattened at the top. It is first green; but, when ripe, turns to a shining black, sits close upon the empalement, and contains a purple juice of a nauseous sweet taste, and full of small kidney-shaped seeds. This particular description may be acceptable in the present publication, because there have been many instances, it is said, of children killed by eating berries of a fine black colour, and about the size of a

small cherry, which are no other than those of the *Belladonna*; and it is asserted, that if an accident of this kind be discovered in time, a glass of warm vinegar will prevent the bad effects.

ATROPHY, in medicine, a disease wherein the body, or some portion of it, does not receive the necessary nutriment, but wastes and decays incessantly.

ATTACHMENT, in law, is the taking or apprehending a person or thing, either by commandment or writ. There is a great difference between *arrest* and *attachment*; he who arrests a person carries him to another higher person, to be disposed of; but he who attaches keeps the party attached, and presents him in court at the day assigned in the attachment. Again, an arrest lies only on the body of the man, an attachment often on his goods also.

ATTAINDER. The stain or corruption of the blood of a criminal capitally condemned; the immediate, inseparable consequence, by the common law, on pronouncing the sentence of death. He is then called *attaint*, *attinctus*, *stained*, or *blackened*. He is no longer of any credit or reputation; he cannot be a witness in any court; neither is he capable of performing the functions of another man: for, by an anticipation of his punishment, he is already dead in law. This is after judgment: for there is great difference between a man convicted and *attainted*; though they are frequently through inaccuracy confounded together. After conviction only, a man is liable to none of these disabilities: for there is still in contemplation of law a possibility of his innocence. Something may be offered in arrest of judgment: the indictment may be erroneous, which

will render his guilt uncertain, and thereupon the present conviction may be quashed: he may obtain a pardon, or be allowed the benefit of clergy; both which suppose some latent sparks of merit, which plead in extenuation of his fault. But when judgment is once pronounced, both law and fact conspire to prove him completely guilty; and there is not the remotest possibility left of any thing to be said in his favour. Upon judgment, therefore, of death, and not before, the attainder of a criminal commences: or upon such circumstances as are equivalent to judgment of death; as judgment of outlawry on a capital crime, pronounced for absconding or fleeing from justice, which tacitly confesses the guilt: and therefore, upon judgment either of outlawry, or of death, for treason or felony, a man shall be said to be attainted.

A person attainted of high treason forfeits all his lands, tenements, and hereditaments; his blood is corrupted, and he and his posterity rendered base; and this corruption of blood cannot be taken off but by act of parliament.

Attainders may be reversed or falsified (i. e. proven to be false) by writ of error, or by plea. If by writ of error, it must be by the king's leave, &c. and when by plea, it may be by denying the treason, pleading a pardon by act of parliament. &c.

ATTORNEY, a proxy; any one acting for another: hence we call a legal power, given in writing, enabling a person, not otherwise concerned, to receive money for him who signs such a writing, a *Letter of Attorney*.

ATTORNEY AT LAW, one who is put in the place of another, to manage his matters at law. Formerly,

every suitor was obliged to appear in person. As a matter of convenience, it is now, by divers statutes, generally permitted, that attorneys may prosecute or defend any action in the absence of the parties to the suit. No attorney can practise in any court, unless he has been admitted and sworn an attorney of that particular court. As an officer of the court in which he is admitted, an attorney enjoys several privileges, and is liable, on the other hand, to the censure and correction of the judges.

ATTORNEY-GENERAL, a great officer under the king, made by letters patent. It is his duty to exhibit informations, and prosecute for the crown, in matters criminal, and to file bills in exchequer for any thing concerning the king, in inheritance or profits; and others may file bills against the king's attorney.

ATTRACTION, in natural philosophy, the primary law of matter, in obedience to which, atoms unite to atoms, and body to body; and by which all created things are prevented from separating, as a handful of dust cast into the air. When a ball is discharged from a cannon, the force by which it is propelled overcomes for a time the power by which it is attracted to the earth; but no sooner has the resistance of the air diminished this force, than it descends with a swiftness proportioned to its weight; that is, to the power with which it overcomes the resistance of the air; but for which, when the propulsion ceased, it would remain afloat, like the down of thistles. That which in common language is called weight, is by philosophers explained to be gravitation; that is, a tendency to the centre of gravity. If a little water, or any other liquid, is

dropped on a table, and a piece of loaf sugar placed upon it; the fluid will ascend, or, ordinarily speaking, be sucked up into the pores of the sugar; that is, the one is attracted by the other. If pieces are pared off two leaden bullets, the surfaces of the parts that are cut being made perfectly smooth, and the two bullets pressed together, they will be found to adhere strongly; that is, they mutually attract each other. If a smooth piece of sealing-wax or amber be rubbed on any woollen body till it be warm, it is well known that it will attract light bodies that are brought within the distance of half an inch or an inch. The attraction of iron by the power of the magnet is familiar to every one. There remains to be mentioned another effect of attraction: if to a phial of water, in which bruised galls have been infused, and which is colourless, be added the contents of another phial, containing a solution of copperas or green vitriol, also colourless, the mixture becomes immediately black: if to this, aqua-fortis (or the nitrous acid, as it is called by chemists), be added, the clearness of the liquor is restored, nothing of its former state being perceived, except a little sediment at the bottom; and, by a farther addition of salt of wormwood in a fluid state, which is an alkali, the black complexion is resumed. These phenomena are explained upon the principle of attraction. The iron which the salt of vitriol contains, has a strong attraction for the galls; and on its union with it, the mixture becomes black; but when the nitrous acid is introduced, the iron, which has a still stronger attraction for this than for the gall, joins with it; and, the galls separated from it, the liquid is again clear. On the admission

of the alkali, the nitrous acid, which has a stronger attraction for this than for the iron, drops the latter; and this re-uniting with the galls, the black colour is restored.

These several kinds of attraction are arranged under five distinct heads. 1. That of the cannon ball falling to the ground, the attraction of gravity, or gravitation. 2. That of the two leaden bullets adhering together, and of water ascending into the pores of the sugar, is called the attraction of cohesion, and also capillary attraction, from the experiment having been made with small tubes in which water will rise to a considerable height. 3. Electric attraction, because the sealing-wax, when warmed by friction, is in an electrified or excited state. 4. Magnetic attraction; and, 5. Chemical attraction, or the attraction of combination; so called because upon it many of the processes in chemistry depend; and because by this means most of the combinations which we observe in salts, the ores of metals, and other mineral bodies, are effected.

AVALANCHES, a name given in Switzerland and Savoy, to wonderful masses of snow that are precipitated, with a noise like thunder, from the mountains, which destroy every thing in their course, and which have sometimes overwhelmed whole villages and their inhabitants in inevitable destruction.

AVARICE, an insatiable, selfish, and hoarding propensity. The word is commonly used for the hoarding of wealth, and in this sense Avarice is the degenerated state of an originally innocent and honourable disposition of the human mind, produced,

for the most part, by the unfavourable circumstances with which humanity has to struggle.

Auctions, and Auctioneers, are regulated in almost all their proceedings by acts of parliament. It is not generally known that a bidder, at an auction, under the usual conditions, may retract his bidding any time before the hammer is down.

AUDIENCE given to ambassadors, a ceremony used in courts at the admission of ambassadors or other public ministers to a hearing. In England, audience is given to ambassadors in the presence chamber; and to envoys and residents in a gallery, closet, or any place where the king happens to be. Upon being admitted to the presence, as is the custom at all courts, they make three bows; after which they cover and sit down: but not before the king has covered and sat down, and has given them the sign to put on their hats. When the king does not wish them to be covered and seated, he himself stands uncovered, which procedure is taken as a slight. At Constantinople, ministers usually have audience of the prime vizier.

AUDIENCE, the name of a court of justice established in the West Indies, by the Spaniards, answering to the parliaments of France, before the revolution.

AVE MARIA, the angel's salutation of the Virgin, and used in the Roman ritual as a form of prayer or ejaculation.

AVERAGE, in commerce, signifies the accidents and misfortunes which happen to ships and their cargoes, from the time of their loading and sailing to their return and unloading; and is divided into three kinds; 1. The simple or particular average,

which consists in the extraordinary expenses incurred for the ship alone, or for the merchandizes alone. Such is the loss of anchors, masts and rigging, occasioned by the common accidents at sea; the damages which happen to merchandize by storm, prize, shipwreck, wet, or rotting; all which must be borne and paid by the thing which suffered the damage. 2. The large and common average, being those expences incurred, and damages sustained for the common good and security both of the merchandizes and vessels, consequently to be borne by the ship and cargo, and to be regulated upon the whole. Of this number are the goods or money given for the ransom of the ship and cargo, things thrown overboard for the safety of the ship. The expenses of unlading for entering into a river or harbour, and the provisions and hire of the sailors when the ship is put under an embargo.

AUGSBURG CONFESSION, denotes a celebrated confession of faith drawn up by Luther and Melancthon, on behalf of themselves and other ancient reformers, and presented in 1530 to the emperor Charles V. at the diet of Augusta or Augsburg, in the name of the evangelic body.

AUGURY, originally a divination, or foretelling of future events, by the actions of birds. This, like other human errors, appears to have arisen from ideas tolerably rational at first. The regular appearance and disappearance of the birds, and the precision that is observable in almost their whole proceedings, might naturally impress an ignorant race of men with a belief that they either inherently possessed, or from time to time received, supernatural information. Accustomed to regulate by

these monitor their rural occupations; the shepherd and the husbandman (then the whole of mankind) were led, by the most excusable association of ideas, to consult the same advisers in the few other concerns of life that fell to their lot: but on the foundation laid by superstition, imposture, assuredly, raised a fantastic structure.

From how many unnecessary fears, from what days and nights of unfounded anxiety and false alarm, has not natural and experimental philosophy delivered mankind! "Of how many pleasing assurances," may the advocate of ignorance, who has the picturesque side of the question, exclaim, "of how many anticipations of delight, of how many salutary warnings, has it not robbed us!" True; and it was not to be expected, *à priori*, that a state of mind to which the Creator has in all ages destined the greater portion of mankind, should be without its blessings.

AUGUST, the eighth month of our year, containing 31 days. August was dedicated to the honour of Augustus Cæsar, because in the same month, before called Sextilis, or the sixth from March, he was created consul, thrice triumphed in Rome, subjugated Egypt to the Roman sway, and put an end to the civil wars.

AULIC, an epithet given to certain officers of the German empire, who compose a court which decides, without appeal, in all processes entered in it. Before the late changes in the empire, the Aulic Council was composed of a president, who is a catholic; of a vice-chancellor, presented by the archbishop of Mentz; and of 18 counsellors, nine of whom are protestants, and nine catholics.

AUMIL, in Bengal, a native collector or manager of a district, on the part of government.

Avoirdupois, the weight by which the quantity of large and coarse goods, as groceries, cheese, wool, lead, &c. are reckoned. Such bakers as live without the boundaries of corporation towns, are directed to make their bread by avoirdupois weight; those in corporations by troy. Apothecaries buy by avoirdupois weight, but sell by troy. The avoirdupois pound contains sixteen ounces. The proportion of a pound avoirdupois to a pound troy is as 17 to 14.

The avoirdupois ounce is less than the troy ounce, in the proportion of 700 to 768, but the avoirdupois pound is greater than the troy pound in the proportion of 700 to 576.

for 1lb. avoird. is = 7000 grains troy.

but 1lb. troy is = 5760 grains troy.

also 1oz. avoird. is = $437\frac{1}{2}$ grains troy.

and 1oz. troy is = 480 grains troy.

The first statute that directs the use of the avoirdupois weight is that of 24 Henry VIII. which plainly implies it was no legal weight till sanctioned by that statute; the particular use to which the said weight is thus directed, is simply for weighing butcher's meat in the market. After this it gradually grew into general use, for weighing such goods as are very coarse and drossy, or subject to waste.

AURICLE, that part of the ear which is prominent from the head.

AURICLES of the heart, are appendages of the heart at its base, distinguished by the names right and left, and they are intended as diverticula for the blood; during the contraction of the heart. In other words, the auricle is a reservoir, holding the blood,

till the ventricle has emptied itself by its contraction.

AURIGA, the waggoner in astronomy, a constellation of the northern hemisphere, containing about 46 stars of the first six magnitudes.

AURUM, see **GOLD**.

AURORA, the morning twilight, or that faint light which appears in the morning when the sun is within eighteen degrees of the horizon.

AURORA-BOREALIS, northern irradiance, northern lights or streamers, a meteor appearing in the northern part of the heavens. It is most frequent and most brilliant during the winter solstice. In the Shetland islands, the *merry dancers*, as they are there called, are the constant attendants of clear evenings, and cheerers of the long winter nights. In still more northern countries, as Norway, Lapland, and Siberia, they greatly enliven the snowy landscapes. They commonly appear at twilight, near the horizon, of a dun colour, approaching to yellow; sometimes continuing in that state for several hours, without any sensible motion; after which they break out into streams of stronger light, spreading into columns, and altering slowly into a thousand different shapes, varying their colours from all the tints of yellow to the obscurest russet. They often cover the whole hemisphere, and then make the most splendid appearance. Their motions, at all these times are amazingly quick; and they astonish the spectator with the rapid change of their form. They break out in places where none were seen before, skimming briskly along the heavens; and are suddenly extinguished, leaving behind them a uniform dusky track. This is again illumined in

the same manner, and as suddenly left a dull blank. In certain nights, they assume the appearance of vast columns, on one side of the deepest yellow, on the other declining away till it becomes undistinguished from the sky. They have generally a strong tremulous motion from the end, which continues till the whole vanishes. In a word, we, who only see the extremities of this northern phenomenon, have but a faint idea of their grandeur or their motions. According to the state of the atmosphere, they differ in colour: they often put on that of blood, and make an awful appearance. It need not be added, that these are among the occurrences of nature at which the ignorant tremble.

With regard to the cause of the aurora-borealis many conjectures have been formed. 1. The first which naturally occurred was, that it resulted from the ascent of inflammable sulphureous vapours from the earth. 2. Dr. Halley, who was unacquainted with the electric power, supposed that this earth was hollow, having within it a magnetical sphere corresponding in virtue with all the natural and artificial magnets on the surface; and that the magnetic effluvia, passing through the earth from one pole of the central magnet to the other, might sometimes become visible in their course, and thus exhibit the beautiful coruscations of the aurora-borealis. 3. "Is not the aurora-borealis" says Mr. Canton, "the flashing of electrical fire from positive toward negative clouds at a great distance, through the upper part of the atmosphere, where the resistance is least?" 4. Mr. Mairan supposed this phenomenon to proceed from the atmosphere of the sun, particles of which were thrown off by the centrifugal force, &c.

quired by his rotation on his axis; and that these particles falling upon the atmosphere of the earth near its equatorial parts, were from thence propelled by the diurnal motion of the earth towards the polar regions, where they formed the aurora-borealis. 5. M. Bernardin de St. Pierre imagines the atmospheric reflection of the beams of the sun from the ice of the poles, to produce these coruscations. 6. It is now generally thought that this is one of the multifarious appearances of the electric fluid; but the precise manner of its operation is by no means settled. From the observations of Mr. Foster in the southern hemisphere, it is received as an established fact, that the course of these flashes is directed from both poles towards the equator. May it be conjectured that the rare state of the atmosphere at the poles, is itself the cause of this phenomenon? or that it is the cause of the visibility of a process which is performed every where? or, to explain why the electricity of those parts of the atmosphere should be constantly found to direct its course from the poles toward the equator, and not from the equator to the poles, may we suppose that it is the return to the equator of the electric fluid drawn during the day to the polar regions? Mr. Dalton says the aurora-borealis is a magnetic phenomenon, the beams being governed by the earth's magnetism.

AUSTRIA, a country of Germany, bounded on the north by Bohemia and Moravia, on the east by Hungary, on the south by Stiria, and on the west by the archbishopric of Salzburg; the river Ens divides it into Upper and Lower. Vienna is the capital of the latter, and Lintz of the former, the whole six

hundred and thirty-seven thousand square miles; and in the year 1784, the number of the inhabitants was one million five hundred and eighty-two thousand, three hundred and ninety-five. It exceeds all other provinces of Germany in the fertility of its soil, abundance of its pastures, salubrity of the air, and beauty of the country; corn, wine, and fruit, every where abound; the saffron is superior to that of India. The inhabitants are polished, intelligent, and warlike. Austria was erected into a marquissate, by the emperor Otho I. and into a duchy by Frederick Barbarossa. The emperor Rodolphus of the house of Hapsburg, seized Austria, from Othogark king of Bohemia, who was slain in a battle near Vienna. This emperor laid the foundation of the grandeur of the present house of Austria, from which most emperors have since been chosen. Austria was then erected into an archduchy with great privileges. The circle of Austria contains, besides the archduchy, the duchies of Stiria, Carinthia, Carniola, the county of Tyrol, the bishoprics of Trent and Brixen, the four forest towns, Rheinfeld, Seckingim, Lausenburg, and Walshut; Austrian Swabia, and the Brisgaw. To the House of Austria likewise belong Bohemia, Moravia, part of Silesia, Hungary, Slavonia, Transylvania, Bosnia, part of Servia, and part of Walachia, the Milanese, and formerly the greatest part of Brabant, Luxemburg, Namur, part of Hainault, and part of Flanders.

AUTHENTIC, something of acknowledged authority. As a law term it signifies something clothed in all its formalities, and attested by persons to whom credit has been regularly given. Thus we say authentic papers, authentic instruments. With re-

spect to books there is an obvious difference between authenticity and genuineness. A *genuine* book, is that which was written by the person whose name it bears, as the author of it. An *authentic* book is that which relates matters of fact as they really happened. A book may be genuine without being authentic: and a book may be authentic without being genuine.

AUTOCRATOR, one who governs absolutely according to his own will. On some extraordinary occasions, the Athenians gave this title and authority to their generals and ambassadors. Ambassadors of this description are known in modern times, under the name of plenipotentiaries.

AUTO-DA-FE. See ACT OF FAITH.

AUTOGRAPH, the very hand-writing of any person; or the original of a treatise or discourse. The word is used in opposition to a copy. Autographa, or original manuscripts of the New Testament, are the copies written by the Apostles, or by amanuenses under their inspection, though even used in this sense, the term is not correct. St. Paul seems generally to have adopted the latter mode; but to prevent the circulation of spurious epistles, he wrote the concluding benediction with his own hand.

AUTOMATON, a self-moving machine, so constructed as to be able to perform its office, for a considerable time, as if by its own will. According to this definition, clocks, and various other pieces of mechanism are automata; but the term is generally used for such as, to support the idea of living power, are contrived under the form of an animal, and made to perform animal functions. Four hundred years before Christ, Archytas of Tarentum is said

to have made a wooden pigeon which could fly: a report that the experiments of the moderns may justify us in believing. When automata are made to represent mankind, they may be called, for distinction sake, ANDROIDES, under which article, the flute-player of M. Vaucanson has been mentioned. This gentleman, encouraged by the reception which that admirable piece of mechanism obtained, made a duck which was capable of eating, drinking, and imitating exactly the voice of a natural one. All the actions of a living duck were copied in a really admirable manner; and even the wings, viscera, and bones, were so formed as very strongly to resemble nature. In Dr. Hutton's Addenda to his *Mathematical Dictionary*, is inserted a letter from Thomas Collinson, esq. by which it appears that much of the capacity of the famous chess-player, made some years ago by M. Kempbell, was to be attributed to a boy, small of his age, who was concealed under the chess-board. This was an imposture in mechanics; but though the *deception* throws a deserved stigma on the production, the performance was still, perhaps, the *acmé* of the art.

AUTUMN, the third season of the year, in which the harvest and fruits are gathered in. It begins on the day when the sun's meridian distance from the zenith, being on the decrease, is a mean between the greatest and the least; which in this part of the world, is supposed to happen when the sun enters *libra* or the *balance*. Its end coincides with the beginning of winter.

AWN, a slender sharp process issuing from the glume or chaff in corn and grasses: it is called in English the beard.

AUXILIARY VERBS, in grammar, such as *help* to form or conjugate others ; that is, are prefixed to them ; as *to have*, and *to be*. In the English language, the auxiliary *am* supplies the want of passive verbs.

AXIOM, from its Greek root, seems to have imported, that the proposition so named was *intirely worthy of credit*. An axiom is a self-evident or incontrovertible truth ; as, that a part is less than the whole.

Axis, in astronomy, an imaginary right line supposed to pass through the earth, sun, planets, satellites, &c. and about which they perform their respective diurnal rotations.

The earth and planets, in their progress through the annual orbit, move in such a manner that the axis of each always keeps parallel to itself, or points to the same parts of the heavens.

The axis of the earth is inclined to the ecliptic, in an angle of nearly $66^{\circ} \frac{1}{2}$, a position which is well adapted for promoting the fertility of the earth and rendering it habitable.

Axis, in geometry, the straight line in a plane figure, about which it revolves, to produce or generate a solid. Thus, if a semicircle be moved round its diameter at rest, it will generate a sphere, whose axis is that diameter. And if a right-angled triangle be turned about its perpendicular at rest, it will describe a cone, whose axis is that perpendicular.

Axis is yet more generally used for a right line conceived to be drawn from the vertex of a figure to the middle of the base.

Axis in Peritrochio, one of the five mechanical

powers, consisting of a peritrochium or wheel, and moveable together with it about its axis. The power is applied at the circumference of the wheel, and the weight is raised by a rope that is gathered up on the axis while the machine turns round. See MECHANICS.

AZIMUTH, in astronomy, an arc of the horizon, intercepted between the meridian of the place, and the vertical circle passing through the centre of an object.

Magnetical Azimuth, is an arc of the horizon contained between the sun's azimuth circle and the magnetical meridian.

AZIMUTH COMPASS, an instrument adapted to find, in a more accurate manner than by the common sea-compass, the sun or star's magnetic amplitude, or azimuth. It is also used to take the bearings of headlands, ships, and other objects at a distance. The azimuth compass differs from the common sea-compass in this, that the circumference of the card, or box, is divided into degrees, and there is fitted to the box an index with two sights, which are upright pieces of brass placed diametrically opposite to each other, having a slit down the middle of them, through which the sun, or star, or other object is to be viewed, at the time of observation. See COMPASS.

AZIMUTHS, called also vertical circles, are great circles intersecting each other in the zenith and nadir, and cutting the horizon at right angles.

AZOR, or **AZORE**, which derives its name from the Greek particle α , privative, and $\sigma\omicron\zeta$, life, signifying that it takes away life, or more properly, that it does not sustain it, is one of the most abundant ele-

ments in nature. In its aeriform state, when it is called *azotic gas* by the French philosophers, it constitutes about three-fourths of the air we breathe. When oxygenated, or combined with oxygen, it forms nitrous acid, or *aqua fortis*. It composes no inconsiderable part of animal and vegetable bodies; from which it may be drawn by a chemical process; and the quantity of ammoniac, or volatile alkali, which, in putrefaction, is emitted by these substances, and which is the chief cause of their fetid smell when in that state, is formed by a union of the hydrogen and azote which they contain.

The properties of Azotic gas are, that it is invisible and elastic; and capable of condensation and expansion. It immediately extinguishes animal life, and the flame of a candle. It has no taste; some plants live and flourish in it. It is not absorbed by water, but is capable of combining with oxygen; and with different proportions of this substance it forms atmospheric air, gaseous oxyde of azote, or nitrous oxyde, nitrous gas, nitrous acid, and nitric acid. It is capable of dissolving sulphur, phosphorus, and charcoal in minute quantities. It unites with hydrogen and constitutes with it ammonia.

AZURE, the blue colour of the sky. Among painters, this word originally signified *lapis-lazuli*, and the blue colour prepared from it. At present, it is called ultramarine; and the blue glass made from the earth of cobalt, and other vitrifiable matters, which, when in masses, is called smalt, is, in the state of fine powder, known by the name of azure. Azure being employed to colour starch, is also called starch-blue.

Azure, in heraldry, the blue colour in the arms

of any person below the rank of a baron. In the escutcheon of a nobleman, it is called *sapphire*; and in that of a sovereign prince, *Jupiter*. In engraving, this colour is expressed by lines, or strokes, drawn horizontally. This colour may signify justice, perseverance, and vigilance; when compounded with

Or	}	it signifies	}	Cheerfulness
Argent				Vigilance
Gules				Readiness
Vert				Enterprise
Purple				Goodness
Sable				Mournfulness

B.

B, The second letter of the English and most other alphabets. It is the first consonant, and first mute, and its pronunciation is supposed to resemble the bleating of a sheep. B is also one of those letters which are called labial, because the principal organs employed in its pronunciation are the lips. It is pronounced by pressing the whole length of them together, and forcing them open with a strong breath. As a numeral, B was used by the Greeks and Hebrews to denote 2; but among the Romans for 300, and with a dash over it (thus \bar{B}) for 3000.

B, is also used as an abbreviation. Thus B. A. stands for bachelor of arts; B. L. for bachelor of laws; and B. D. for bachelor of divinity.

BABOON, in zoology; a subdivision of the monkey tribe, adopted by Buffon. According to that great naturalist, the apes are those that are totally destitute of tails; the baboons have short tails, and those of the monkeys are long.

BABYLON, the capital of the ancient kingdom of Babylonia or Chaldæa, and supposed to have stood in E. long. 44. 30. N. lat. 33. 20. Semiramis is said by some, and Belus by others, to have founded this city. But by whomsoever it was founded, Nebuchadnezzar was the person who put the last hand to it, and made it one of the wonders of the world.

This capital was, according to Herodotus (who was himself at Babylon) surrounded with walls, in thickness 87 feet, in height 350 feet, and in compass 480 furlongs, or 60 of our miles. It is observed, that those who give the height of these walls but at 50 cubits, speak of them only as they were after the time of Darius Hystaspis, who had caused them to be beaten down to that level. These walls formed an exact square, each side of which was 120 furlongs, or 15 miles in length; and were all built of large bricks cemented together with bitumen, which in a short time grows harder than the very brick and stone which it cements.

BAC, in *navigation*, a sort of ferry-boat; in *brewing*, a large kind of tub, wherein the wort is put, to stand and cool before boiling; in *distilling*, a vessel into which the liquor to be fermented is pumped from the cooler, in order to be worked with yeast.

BACCHANALIA, popular, and, as almost all such things will be, somewhat licentious, feasts, celebrated in honour of Bacchus by the ancients. They were *fêtes-champêtres*, and *bals-parées*. Their times of celebration were spring and autumn: the former in the city, and the latter in the fields. The company personified Silenus, Pan, fauns, and

satyrs ; and learned scandal says, that the characters were fully sustained : but, in their institution, they were scenes of cheerful innocence, and recals of " the old age."

BACHELOR, in all its various senses, seems to include the idea of youth, or immaturity. In general society, the term is applied to an unmarried man. In many ancient states, rigorous laws were put in force against bachelors ; and there can be no doubt that they are not the most useful members of the community. In England, by 7 Will. III. 1695, an unmarried duke, of the age of twenty-five years, paid a tax of 12*l.* 10*s.* and a common person 1*s.* At present, every man of the age of twenty-one years, and upward, never having been married, who keeps one male servant or more, shall pay 1*l.* 5*s.* for each, in addition to the ordinary duties leviable for servants ; and every man of twenty-one years and upward, never having been married, keeping one female servant, pays 2*s.* 6*d.* in addition to the ordinary 2*s.* 6*d.*—5*s.* in addition for each, if he has two female servants ; and 10*s.* in addition for each, for three or more female servants.

Bachelor, an ancient denomination of knight-hood, given to such as had not a sufficient number of vassals to carry their banner ; or to such knights-bannerets as were not of age to display their own banner ; or, to young cavaliers, little more than initiated to arms ; or, in a very honourable sense, to him who had overcome his antagonist in his tournament.

Knights-Bachelors, the lowest rank of knights, whose title was not hereditary. These are the *knights* of modern days.

Bachelor, in universities, one who has attained the first degree in the liberal arts and sciences, or the first degree in the particular study to which he devotes himself. At Oxford and at Cambridge, to attain the degree of bachelor of arts, a person must have studied there four years: after three more, he may become master of arts; and at the end of another series of seven, bachelor of divinity. He may commence bachelor of law after having studied it six years.

Bachelor, in the livery companies of London, is one who is not yet admitted of the livery; also called *yeoman*. The derivation of the word *bachelor* is much disputed. It is probable, considering how greatly the manners of Europe have grown out of chivalry, that it originated solely with the military profession. It has been said to come from *bucecellarius*, a kind of cavalry; from *baccalaria*, fiefs of twelve acres, the possessors of which were called *bachelors*, (though the fiefs might be called *baccalaria*, because their possessors were bachelors); from *baculus*, or *bacillus*, a staff, because the young cavaliers fought with staves; from *baccalaureus*, in allusion to the ancient custom of crowning poets with laurel, *bactis lauri*. It is possible that, in contradiction to what has been said above, respecting the sameness of the origin, the university bachelor may be derived from *baccalaureus*; though, in Italy, where alone the ceremony mentioned appears to have been practised, the universities are unacquainted with bachelors: but nothing seems more likely than that we have the word from *bas-chevalier*, ["sub-knight"] a French term for one below the dignity of a knight.

BACHELOR, in music, one who has taken his first degree in music. The qualification for this honour was, formerly, to be able to read and expound certain books of Boethius. Now the candidate is required to compose an exercise for voices and instruments, in six parts, which exercise is publicly performed in the music-school, or university.

BACK, in brewing, a large flat vessel in which the wort is put to stand and cool before boiling. The ingredients of beer pass through three kinds of vessels: they are mashed in one; worked in another, and cooled in a third, called backs or coolers. See BREWING.

BACK-gammon, an ingenious game played with dice and tables, to be learned by observation and practice.

BACK-staff, an instrument formerly used for taking the sun's altitude at sea: it had its name because the back of the observer was turned towards the sun.

BACKING, in law, a warrant of a justice of peace, which is granted in one jurisdiction and to be executed in another; as where a felony is committed in one county, and the offender escapes to another: in this case, if proof be given of the hand-writing of the justice who granted the warrant, a justice in the other county indorses or writes his name at the back of it, by which he gives authority to execute the warrant in that other county.

BADGE, in naval architecture, an ornament placed on the outside of ships near the stern, containing either a window or the representation of one.

BAG, in commerce, a term signifying a certain

quantity of a particular commodity: a bag of almonds is about 300 weight.

Bag, in farriery, contains an ounce of assafetida, with as much powder of savin, which, being tied to the bitt, and the horse kept bridled for two hours, several times a day, will procure an appetite where it is deficient.

BAGGAGE, in military affairs, denotes the clothes, tents, utensils of divers sorts, provisions and other necessities belonging to an army.

BAG-PIPE, a musical instrument of the wind kind, chiefly used in country places, especially in Scotland. It consists of a bag and pipes or reeds.

BAIL, in law, surety for the appearance of a person who, on account of any process entered against him, civil or criminal, must otherwise be committed to prison till the time of trial. All civil cases are bailable; but many criminal ones are not; a distinction founded on the reason of the subject. Wherever money is the matter at issue, it is evident, that, if the defendant can find persons willing to take upon themselves the risque of payment, justice cannot be defeated; but where property is not concerned, where liberty or life is at stake, the penalty of bail-bond is no adequate security against the prisoner's escape; and, if forfeited, insufficient to answer the demands of the law.

BAILIFF, a word derived from the French, and originally used to denote, as in France, an officer of great trust and authority. We have still chief magistrates of towns distinguished by that name; and the person to whom the care of a castle is committed, is, in some instances, called a *bailiff*: but the name is now held in contempt, on account

of one part of the duty of the bailiff of a sheriff, which is usually performed by mean persons: that of executing writs of arrest. A county, which is under the jurisdiction of a sheriff, is subdivided into hundreds. Over each hundred is a bailiff, whose duty it is to collect fines therein; to summon juries, to attend the judges and justice, at the assizes and quarter-sessions, and to execute writs and processes in his district. This is a *bailiff of the hundred*; the officer generally known by the name, is a *special bailiff*.

Bailiff, is also the name of an officer in every manor, and a sort of observer in husbandry and rural concerns.

Water-Bailiff, an officer who searches ships, gathers toll for anchorage, and arrests persons for debt upon the water.

BAILIWICK, a liberty exempt from the power of the sheriff, in which district the lord exercises the office of sheriff, and appoints his own bailiff. A bailiwick is also the hundred, or district, through which the authority of a bailiff extends.

BAILMENT. The law of bailments is that by which persons receiving goods, without any particular contract to that effect, are made responsible for their safety and re-production.

BAKER, a person who prepares bread, or who reduces meal of any kind into bread, biscuits, &c. In Rome the business of a baker was in high estimation. In this country, from very early times, bakers have not borne the best reputation. Formerly there was a pillory in Cornhill, expressly kept for the exhibition of fraudulent bakers, who either adulterated the materials, or whose loaves

were deficient in weight. Bread in London denominated "Wheaten" or "Household," and is marked with a W or H.--See BREAD.

BALANCE, in mechanics, a peculiar application of that simple mechanical power called the lever by which it is rendered useful in determining the difference or equality of weights in heavy bodies and consequently their masses or quantities of matter. The characteristic difference between a balance and a lever we conceive to consist in this, that the former is suspended from something which is above it, the latter supported by a prop or fulcrum below it. See MECHANICS.

BALANCE. See CLOCK and WATCH.

BALANCE OF POWER, originates from, and is maintained by the alliances of different nations, as their circumstances and interest may require. Bonaparte has of late years set at defiance all principles connected with this subject, by seizing the whole power and resources of Europe.

BALANCE OF TRADE, the equal exportation of native commodities; and importation of foreign. When a nation imports to a greater extent than it exports, the balance of trade is said to be against it; that is, it loses by its trade. This is very clear. The native commodities of a nation are its income, its property; and it needs no subtle logic to discover, that where-ever purchases exceed the income, there is a tendency to bankruptcy. Where the income expended, and the purchases received, are equal, there is no increase of property, but a convenient interchange of commodity. He that having cultivated a plot of ground, instead of subsisting himself upon the produce, exchanges it for

that of some other soil, quantity for quantity, is obviously not the richer for his bargain: he has merely gratified his taste at the expence of his labour; his imports are equal to his exports; his expences are equal to his income. If he can obtain the foreign article for a part only of his native produce, his wealth is actually increased; his exports are greater than imports; his income is greater than his expences: but if he parts with his own native produce for a smaller quantity of foreign, he is a loser; his imports are greater than his exports; his expences are greater than his income.

BALE, in commerce, a cloth package of goods, and a customary quantity: thus, a bale of cotton yarn is from 300 to 400 weight.

BALE-GOODS, with English merchants, are such as are packed in bales; but the French give that name to certain indifferent hardwares that are sent to Paris.

BALL, in military affairs, comprehends all sorts of bullets for fire arms, from the cannon, to the pistol; those for pistols and small arms are made of lead, but cannon-balls are formed of cast iron, and they are distinguished by their calibres, thus

a ball that weighs	49	pound, has a diameter of	6.7 inches.
	34		6.1
	24		5.4
	18		5.0
	12		4.4
	9		4.0
	6		3.5
	3		2.7
	2		2.4
	1		1.9

BALLAD, a popular song, adopted to the lower class of the people. It is usually a simple tale, contained in three or four verses or stanzas.

BALL-and-sock instrument, is made to move horizontally, vertically, and obliquely, and used for surveying and astronomical instruments. Many of the joints in the human frame are on the principle of the ball-and-socket.

BALLAST, heavy matter, as stone, gravel, iron, &c. thrown into the hold of a ship, to sink her to a proper depth in the water, that she may be capable of carrying a sufficient quantity of sail without over-setting. The ballast regulates the ship's center of gravity, upon the due situation of which her sailing and safety greatly depend.

In ballasting a ship, three considerations are to be kept in view: the centre of gravity, the centre of motion, and the *point-velique*, or centre abaft the foremast, upon which the ship pitches. In the arrangement necessary for these purposes, the model, size, and form of the ship, must be consulted. All descriptions of ships should be balanced on one point as much as possible; and the placing the cargo, ballast, guns, or whatever the ship is to contain, is one of the greatest secrets in naval tactics. In a ship, of whatever form, the ballast must be placed in such a manner as to unite, as much as possible, the three points already mentioned; but little practical knowledge on this subject can be acquired otherwise than from actual experience. As general rules, it may be observed that, in a sharp-built ship, the ballast should be as low as possible; and, in a flat one, the reverse.

BALLET, a characteristic dance, consisting of

three parts, the entry, the figure, and the retreat.

BALLOON. See *Aerostation*.

BALLOON, a round short-necked vessel used by the chemists for the process of distillation

BALLOTING, a method of voting secretly at elections, in which, as the voter may follow his inclination without making a public discovery of it, his choice has the better chance of being independent. *Ballot*, is a French word for a *little ball*. The voter puts into a box, or other receptacle, a white ball or a black one, according as he wishes to say, yes or no.

BALLS, in electricity, are two pieces of cork, or pith of elder, nicely turned in a lathe to the size of a small pea, and suspended by linen or silken thread, intended as electrometers, to discover small quantities of electricity.

BALLS, in meteorology, luminous bodies, generally appearing at a great height above the earth, with much splendour. Their tract is usually from north to south, and their velocity is very great. See *METEORIC STONES*.

BALLUSTRADE, a series or row of balusters, joined by a rail; serving as well for rest to the elbows, as for a fence or inclosure to balconies, altars, staircases, &c. The heights of ballustrades vary according to circumstances.

BALNEUM, bath, in chemistry, a contrivance to modify and regulate the heat in various chemical processes, particularly distillations, by the use of different intermedia. When the degree of heat required is below that of boiling water, a vessel containing that fluid is interposed between the fire and the substance to be acted upon; and when a supe-

rior degree of heat is necessary; sand, or some other matter of a similar nature is employed.

BALSAM, an oily, resinous or liquid substance, flowing either spontaneously; or by means of incision; from certain plants, and used in the cure of several kinds of wounds, diseases, &c. Thus we have the Balsam of Copaiva; the Balsam of Tolu: the Balsam of Peru. There are likewise solid balsams, viz. Benzoin, Storax and Dragon's blood.

BALTIC SEA, this may be reckoned an Inland Sea, that opens from the German Ocean, by an inlet pointing N. E. called the Skager Rack, and afterwards passing S. in what is called the Cattegat to the Sound of Elsinore, a narrow entrance, or Strait, where vessels pay tribute to Denmark. Thence the Baltic extends east, and north east, in 60° N. latitude, dividing into two branches, called the gulfs of Bothnia and Finland; the former reaching northward about 100, and the latter eastward, 70, leagues. Both of these gulfs are covered, or interrupted, by ice, during four or five months in winter. The greatest depth of the Baltic is said not to exceed 50 fathoms, and its shallowness gradually increases at the rate of 40 inches in a century. Tides are there unknown; and the waves are not of such magnitude as those of the German Ocean; but rising more abruptly, and in greater numbers, they are sometimes turbulent and dangerous. When violently agitated, this sea throws up, on the coasts of Courland and Prussia, amber in considerable quantities. In several places the variation of the magnetic needle is remarkable. In one place particularly, it points between the south-west and west; and in another it points to the north-west.

The water of the Baltic is not very salt, on account of the many rivers which discharge themselves into it. Some persons who have analysed it, assert that it does not contain more than $\frac{1}{30}$ th part of salt; whereas other sea water often holds $\frac{2}{30}$ ths parts.

BAMBOO, a very large species of the arundo or cane; it grows about the tropical regions, and was a native of Asia, but it has long since been introduced into the West-India Islands. It is used in building, in making bridges, vessels, boxes, caps, baskets, mats, and other utensils and furniture. Paper is likewise manufactured from it: it is the common fence for gardens and fields, and is used for pipes to convey water wherever it is wanted. The leaves are generally put round the chests of tea which are sent to Europe from China, to form a kind of mat. The tender tops make a fine pickle.

BAMBOO HABIT, a Chinese invention, by which a person, who cannot swim, may easily keep himself above water. Four bamboos, two before and two behind their bodies, are placed horizontally, and project about twenty-eight inches. They are crossed on each side by two others, and the whole properly secured, leaving a space for their body; it is put over their heads, and tied secure in two minutes.

BANANA, the fruit of the plantain, a species of palm. Dampier compares it, when stripped of its integuments, to a large sausage, in size and shape; and to fresh butter in winter, as to substance and colour. Its taste resembles that of an apple, or the pear called by some the *good christian*, which melts in the mouth like a marmalade.

BANDITTI, robbers who infest the southern parts

of the continent, in troops. They are persons who live wholly unconnected with established society; but not unmindful of a certain legislation among themselves. They have even obtained the character of scrupulous honor; and rendered themselves so powerful as not to be treated like common highwaymen. Unable to dislodge them from their fastnesses, especially in the neighbourhood of Mount Etna, it has been found expedient to make the best compromise. The prince of Villa Franca, as a matter of prudence, has declared himself their protector; and such of them as choose to leave their forests, even temporarily, are safe, and receive an unbounded confidence, which they have never been known to abuse. Travellers put themselves under their care; and, it is said, that no one who has done so, ever had cause to repent of the proceeding. The name *banditti* appears to have originated with *outlaws*, called *bannitti*, to the miserable policy of placing persons in which situation, the existence of these pillagers of society is, probably, to be ascribed.

BANIAN-DAYS, a proverbial expression, imported from the Asiatic colonies, used for a short or indifferent dinner, or days on which no animal food is eaten; in allusion to the Banians, the mercantile cast among the followers of Brahma, who, believing in the metempsychosis or transmigration of souls, will not kill any living creature.

BANK, a repository for money, from *banco*, the Italian word for a bench; the Lombard Jews having introduced banking, by keeping benches in the market places, for the exchanging of money. Banks, in the principle upon which they are con-

ducted, differ very distinctly from each other. Thus, the banks of Amsterdam and Genoa are standards of good and true money, in opposition to the current value of the clipt and worn coin which an extensive trade renders almost the whole circulation of a small state. The value of bank or standard-money above that of currency, is called the *agio*. In speaking of money at Hamburgh and other places on the continent, we commonly hear of marks-*banco*; that is, standard, or sterling money. The banks of Scotland keep what are called cash accounts, lending sums of money to responsible persons, receiving small sums in payment, and discounting a proportionable part of the interest of the great sum from the day on which each of these small sums is paid in, till the whole be in this manner repaid. All merchants, therefore, and men of business, find it convenient to keep such cash accounts with them, and are, consequently, interested in promoting the trade of those companies by readily receiving their notes in all payments, and by encouraging those with whom they have any interest to do the same. The banks, when their customers apply to them for money, generally advance it in their own promissory notes. These, the merchants pay away to the manufacturers for goods, the manufacturers to the farmers for materials and provisions, the farmers to their landlords for rent; the landlords repay them to the merchants for the conveniences and luxuries with which they supply them; and the merchants again return them to the banks, in order to balance their cash accounts, or to replace what they may have borrowed: and thus, almost the whole mo-

money-business of the country is transacted through the medium of these notes. The basis of all banking is the profitable use to which the banker or company can apply the capital which is deposited. An ordinary banker is a depository in whose hands money is placed for convenience; and his business is chiefly that of discounting bills of exchange; that is, advancing money upon them before they are due. He deducts, upon whatever he advances, the legal interest till the bill shall become due. The payment of this bill, when due, replaces to the bank the sum that had been advanced, together with a clear profit to the amount of the interest. The banker who advances to the merchant whose bill he discounts, not gold and silver, but his own promissory notes, has the advantage of being able to discount to a greater amount, that is, to the extent of his credit, and is thereby enabled to make his clear gain of interest on so much a larger sum.

Added to this source of profit in money-dealings, there are others in the purchase and sale of bullion, foreign coin, &c. and on these foundations arose the

BANK OF ENGLAND. In the fifth and sixth year of William and Mary, [A. D. 1694, 1695] in consideration of a loan to government of 1,200,000*l.* at an interest of almost eight *per cent.* a company was incorporated by the name of the "Governors and Company of the Bank of England," with a restriction by which they were prevented from dealing in any other than money concerns. Thus commenced the national debt. This amount was the capital of the company; and the interest, ex-

exclusive of its trade in bullion, &c. its profit. In the 8th and 9th of the same reign, this capital was augmented to 2,201,171*l.* 10*s.* In the 7th of Ann, it was increased to 4,402,348*l.* at which time the company advanced a loan of 400,000*l.* and in the year 1714, another of 1,500,000*l.* In the 3d of George II. the interest on their capital was reduced to 3 per cent. and in consideration of an annuity of 100,000*l.* they agreed to deliver up exchequer-bills to the amount of 2,000,000*l.*: which interest was afterward reduced from 5 to 4 per cent. and, some other annuities purchased by the bank being redeemed, the national debt was reduced to 1,600,000*l.* In 1742, this was doubled; a loan of 1,600,000*l.* being supplied. This latter sum was advanced at 3 per cent. and was that now called the 3 per cent. annuities: the debt was, therefore, 3,200,000*l.* the one half carrying 3 and the other 4 per cent.

In the year 1746, the company having in its possession unsatisfied exchequer-bills, and being also a creditor of government for money advanced on certain duties for licences to sell spirituous liquors by retail, amounting, together, to 986,800*l.* agreed to cancel the same in consideration of an annuity of 39,442*l.* the interest of that sum at 4 per cent. At this time, also, the company contracted to advance the farther sum of 1,000,000*l.* into the exchequer, for which it received exchequer-bills. In return for this assistance, it was empowered to add the sum of 986,800*l.* to its capital, the interest of which, as that of the other annuities, was reduced to three and a half per cent. At the 25th of December, 1757, and from that

time allowed to carry only three *per cent.* The company of the bank were formerly obliged to keep in constant readiness a sufficient quantity of specie to answer all ordinary and even extraordinary demands, this has been dispensed with since the year 1797. The charter of the bank extends to the year 1833 : for a renewal of their charters they have always paid government large sums of money. The chief privilege consists in the prohibition of all other companies, of more than six persons : from issuing bills payable on demand, or for any time less than six months. The permanent debt due to the bank from government, is upwards of eleven millions, bearing three *per cent.* interest : the capital stock of the company is likewise more than eleven millions, on which they pay a dividend of 10*l. per cent.* to the proprietors. The profits of the company arise from the interest received from government on the permanent debt : on their annual advances on exchequer-bills, &c. from their allowance for receiving the contributions to loans, and for paying the dividends on the public funds ; from dealing in bullion, and from their large discounts with a mere paper currency.

The affairs of this company are in the hands of a governor, deputy-governor, and twenty-four directors, who are annually elected by the general court.

BANKRUPT, one who; having been engaged in trade, is unable, or unwilling, to pay his debts. In this case, the law takes the affairs of the insolvent man into its own hands ; divides his property among his creditors as far as it will go ; and releases him from the danger of farther molesta-

tion. Bankruptcy may either be forced upon a dishonest man, or coveted by an unfortunate one. In all cases, some act of bankruptcy must be committed, before a creditor can render his debtor a bankrupt; and an act of bankruptcy is an act of such a nature as evinces an intention on the part of the debtor to deprive his creditors of the security which they might have in the possession of his person or his property. As falling under this description, the following are considered as acts of bankruptcy. 1. Departing from the realm, whereby a man withdraws himself from the jurisdiction and coercion of the laws. 2. Departing from his own house, and thus secreting himself. 3. Keeping in his own house, except for just and necessary cause, so as not to be seen or spoken with by his creditors. 4. Procuring, or suffering himself willingly to be arrested, or outlawed, or imprisoned, without just and lawful cause. 5. Procuring his money, goods, and chattels, and effects to be attached or sequestered. 6. Making any fraudulent conveyance of his property to a friend, or secret trustee. 7. Procuring any protection, not being himself privileged by parliament, to screen his person from arrest. 8. Endeavouring or desiring, by any petition to the king, or bill exhibited in any of the king's courts against any creditors, to compel them to take less than their just debts, or to procrastinate the time of payment originally contracted for. 9. Lying in prison for two months or more, upon arrest or other detention for debt; because the inability to procure bail argues a strong deficiency in his credit, owing either to his suspected poverty, or

ill character: and his neglect to give bail, if he is able to do so, can arise only from a fraudulent intention. 10. Escaping from prison, after an arrest for a just debt of 100*l.* or upward: since no man would break prison who was able and desirous to procure bail. 11. Neglecting to make satisfaction for any just debt by a trader having privilege of parliament.

It was held by sir John Holt, that a man's removing his goods privately to prevent their being seized in execution is not an act of bankruptcy: for this, though a palpable fraud, is not mentioned by the statutes. It has also been expressly determined, that stoppage or refusal of payment by a banker is no act of bankruptcy; because he may have good reason, as suspicion of forgery. He may, however, on being arrested, become liable, by committing the ninth act in the foregoing enumeration.

BANN, or BAN, a British word for a proclamation; is used for the public notification of an intended marriage. Unless a licence be obtained from the bishop, no marriage can be solemnized in England until the bann has been published three several times in the face of the congregations, in the parishes of the man and the woman: so that if there be any just reason why such marriage should not take place, due opportunity may be given for exception being taken.

BANN OF THE EMPIRE, is a sentence that may be passed by the diet upon a prince or free city of Germany, in consequence of which, till such bann be recalled, the rights and privileges of the city or sovereign are taken away.

BANNERET, an ancient order of knights or feudal lords, who, possessing several large fees, led their own flag or banner. As the spirit of the feudal system declined, persons came to be created bannerets, and hence the institution must have become merely titular. The last knight of this description was sir John Smith, on whom the honour was bestowed after Edgehill fight, for rescuing the standard of Charles the first.

BAPTISM, a rite of the Christian religion, by which the members of its church are received into the communion. It is sufficient to refer to the *book of common-prayer*. Almost all sects of Christians style baptism a sacrament, and consider its use as important; but the manner in which it ought to be performed, and the effects to be derived from it, have been subjects of much controversy. The Remonstrants and Socinians reduce baptism to a mere sign of divine grace. The Romanists, on the contrary, exalt its power; holding that by it all sin is entirely taken away; that it absolutely confers the grace of justification, and consequently grace, *ex opere operato*. Some also speak of an indelible or ruling character impressed on the soul by it; but this is held by others a mere chimera, for that the spiritual character conferred in regeneration may easily be effaced by mortal sins. Dodwell maintained, that it is by baptism the soul is made immortal; so that those who die without it will not rise again. It must be added, he restrains this effect to episcopal baptism alone. Some Christians, like the Jews, restrain baptism to the admission of new members into the church, and hold that it ought to be administered only to new converts, and

not to the children of persons already believers in Christianity. The Bramins baptize with this latter view, at certain seasons, in the river Ganges. The necessity of baptism to salvation, is grounded on the words of Jesus: "He that believeth and is baptized shall be saved;" and, "Except a man be born of water and of the spirit, he cannot enter into the kingdom of God;" but the primitive professors of Christianity do not, generally speaking, appear to have thought that the mere want of baptism, excluded man from the hopes of salvation.

Baptism, abusively, the ceremony of giving names to inanimate things; as the great bell of the Lateran, which was christened by pope John III. Among sailors, a ship is generally christened at the time of launching her; and a ceremony or custom observed on board merchantmen, when crossing the line, is known by this name. Persons and vessels that have not yet been under the line, are to be baptized. With respect to the ship, the office is very simple, and not less commendable: she is washed throughout with seawater. As to the passengers, the mysteries require a more extended description. The oldest of the crew that has passed the tropic or line, comes with his face blacked, a grotesque cap on his head, and some sea-book in his hand, followed by the rest of the seamen, dressed like himself, each having some kitchen utensil in his hand, with drums beating: he places himself on a seat on the deck, at the foot of the mainmast; and at the tribunal of this mock magistrate each passenger not yet initiated, swears he will take care the same ceremony be observed whenever he is in the like circumstances.

Then, by giving a little money, by way of gratification, he is discharged, with a little sprinkling of water ; otherwise he is heartily drenched with streams of water poured upon him. The ship boys are inclosed in a cage, and ducked at discretion. The seamen, on baptizing the ship, pretend to a right of cutting off the beak head, unless redeemed by the captain. It has been justly remarked, that it is politic in commanders to allow a frolic, which serves to relieve the tedium of a protracted voyage.

BAPTISTS, a sect of Christians who maintain, in opposition to others, that the word *baptism* means *immersion*, and that, therefore, those who are only *sprinkled* are not *baptized*. The baptists in England form one of the denominations of protestant dissenters. In other respects, they separate from the established religion for the same reasons as other dissenters. In 1538, a proclamation was issued against them, and several were burnt in Smithfield. Baptism is administered in the Greek church in the manner approved by the baptists ; and it is even so directed, though not insisted on, by the church of England. In the latter, it is dispensed with, under the idea of danger to the health of infants ; and infant-baptism, in reality, is the true point in dispute.

BAR, in music, a stroke drawn perpendicular across the lines of a piece of music, including between each two a certain quantity or measure of time, which is various, as the time is either triple or complex. In common time, between each two bars is included the measure of four crotchets. The principal use of bars is to regulate the beating of time in a concert.

BARBACAN, or BARBICAN, an outer defence to a city or castle, used especially as a defence to a city or walls; also an aperture made in the wall of a fortress, through which to fire upon an enemy.

BARBER, one who makes a trade of shaving the beards and heads of men, and of making wigs, &c. Formerly the business of a surgeon was united to that of a barber, and he was denominated a barber-surgeon. This union of profession was dissolved by a statute of Henry VIII. by which the surgeons were formed into a distinct corporation, that existed till the late establishment of the royal college of surgeons of London. In England a musical instrument was part of the furniture of a barber-surgeon's shop, which was used by persons above the ordinary level of life, who resorted thither for the cure of wounds, for bleeding, or trimming, a word that signified shaving; and cutting, or curling the hair. Bleeding and tooth-drawing are now very commonly practised in country places by barbers; and the pole stuck out as the sign of their profession, is supposed to indicate the staff which is held in the patient's hand during the act of bleeding, and the fillet with which it is bound, represents that which binds the arm after the operation is completed.

BARCA, a country of Africa, between Tripoli and Egypt. It is a barren desert, chiefly inhabited by some tribes of wandering Arabs. In this country stood the famous temple of Jupiter Ammon; and notwithstanding the pleasantness of the spot where it was erected, this part of the country is said to be the most dangerous of any, being surrounded with vast tracks of quick and burning sands, which are very detrimental to travellers; not only as

they sink under their feet, but being light, and heated by the rays of the sun, are easily raised by every trifling breeze of wind; which, if it be in their faces, almost burns their eyes out, and stifles them, or, if vehement, overwhelms them.

BARD, a poet of the earliest ages of society. The poet of more advanced periods differs from the bard, on account of the complexity of his subject and ideas, which render his verses unfit for musical performances. In the first stages of society, in all countries, bards have made a conspicuous figure; and the "light of the song" has been the morning-beam that first broke upon the darkness of ignorance: but no where does it appear, did ever verse and its professors receive so much public regard as under the druidical establishment; a regard with which they continued to be honoured long after that system had perished. We gather from Cæsar's observations, that it was part of the policy of the druids to prevent their songs from being committed to writing. In latter times, this restraint was removed; every one had access to them without a bard; and the profession, in consequence, sank by degrees into oblivion.

BARILLA, or **BARHILNA**, the name of a plant cultivated in Spain for its ashes, which are used in making glass and bleaching linen. Mr. King, of Newcastle upon Tyne, has procured a patent for a composition which he calls British-barilla, and which, he says, is superior to the Spanish for the making of crown window-glass, broad window-glass, and glass-bottles, and also in the manufacturing of soap and alum. The materials of which the British barilla is to be made are as follows:

“ Take a certain quantity of ashes obtained by burning the loppings or branches of ash, or any other kind of green wood or bramble, and an equal quantity of the ashes obtained by burning the green vegetables known by the name of fern, brecon, hean and pea-straw, whins, common field and highway thistles, the stalks of rape or mustard-seed, or, the bent or rushes that grow by the sea-shore.”

Good barilla is firm, hard, heavy, porous, dry, and sounds on percussion : it is of a blueish colour, and imparts a flavour at first slightly resembling that of a violet. The plants, about the time the seeds become ripe, are pulled up by the roots, and exposed in a suitable dry place, where they are tied up in bundles, and burned in an oven constructed for the purpose, where the ashes are continually stirred, while hot. The saline matter falls to the bottom, and on becoming cold, forms a hard, solid mass, which is afterwards broken into pieces of convenient size for exportation. The term British barilla is applied sometimes to kelp, a much more impure soda, and sometimes, though improperly, to pearlash, or the ashes of plants containing potash.

BARK, in the anatomy of plants, the exterior part of trees, corresponding to the skin of an animal. As animals are furnished with a *panniculus adiposus*, usually replete with fat, which invests and covers all the fleshy parts, and screens them from external cold ; so plants are encompassed with a bark replete with fatty juices, by means whereof the cold is kept out, and in winter-time the spicules of ice prevented from fixing and freezing the juices in the

vessels: whence it is, that some sort of trees remain evergreen the year round, by reason their barks contain more oil than can be spent and exhaled by the sun, &c. It appears that trees stripped of their bark in the time of the sap, and suffered to die, afford heavier timber, more uniformly dense, stronger, and fitter for service, than if the trees had been cut down in their healthy state.

Bark, in medicine, see *Cinchona*.

BARK, a small vessel with two or three triangular sails. It carries about 200 tons.

BARLEY, a sort of grain, principally used in England in the state of malt, for brewing.

Pearl barley and *French barley*, barley freed from the husk by a mill; the distinction between the two being, that the pearl barley is reduced to the size of small shot, all but the very heart of the barley being ground away.

Barley-corn, the least of our long measures, being the third part of an inch.

BARM, or **YEAST**, used in the composition of bread, to render it light. When the art of brewing became known, this ingredient, which is much better adapted to the purpose than any thing previously used, was discovered. It is the spume which arises on the surface of the beer in fermentation.

BAROMETER, a *measurer of weight*, an instrument for measuring the weight of the atmosphere, and of use in ascertaining and anticipating the changes of the weather, and also for measuring the heights of mountains, &c. The common barometer consists of a glass tube, hermetically sealed at one end, and filled with quicksilver, well purified, and purged of its air. The finger being then placed at the open

end, in immediate contact with the mercury, so as not to admit the least particle of air, the tube is inverted, and the lower end plunged into a basin of the same prepared mercury ; then, upon removing the finger, the mercury in the tube will join that in the basin, and the mercurial column will rise in the tube to the height of 29 or 30 inches, according to the state of the atmosphere at that time. This is the principle upon which all barometers are constructed. Fig. 15.

BARON, at present, a peer of the lowest degree: Baron was a territorial title; and being attached to hereditary property, in its nature hereditary. In the feudal system, which was a complete aristocracy, or at best, an assemblage of petty states under one head, the barons naturally asserted their right to a share in the deliberations of a government which they undertook to support. Hence the origin of a parliament; and thus the territorial chiefs were peers of parliament. The word *baron* appears to be derived from *varo* or *baro*, a stout, noble person. Modern lords of manors are the remains of the original barons.

Barons of the Exchequer, the four judges to whom the administration of justice is committed in causes between the king and his subjects in matters concerning the revenue. They are not, as barons of the exchequer, peers of parliament.

Barons of cinque-ports, members of the house of commons, elected by the five ports, two for each port.

BARONET, the lowest degree of honour that is hereditary. The order was founded by king James I. at the suggestion of sir Robert Cotton, when 200

Vol. I.

Miscellaneous.

baronets were created at once! to which number it was intended they should be always restrained: but it is now enlarged at the king's pleasure, without limitation. On their institution, they were allowed to charge their coat with the arms of Ulster in Ireland, which province they were to defend against the rebels, who then harassed it extremely: to which end they were each to raise and keep up 30 soldiers at their own expence for three years together, or to pay into the exchequer a sum sufficient to do it; which, at 8*d.* per day per head, was 1095*l.* So that, including fees, the expence of this dignity may be about 1200*l.* sterling. The baronetcies of Scotland, or of Nova Scotia in America, and of Ireland, were instituted with similar views to the advantage of the state.

BARREL, contains the eighth part of a ton of wine: of beer it contains 36 gallons.

BARRISTER, a counsellor learned in the law; admitted to plead at the bar, and there to take upon him the protection and defence of clients. They are termed *juris consulti*; in some countries *licentiate jure*; and anciently, barristers were called *apprentices of the law*: in latin, *apprenticii juris nobiliores*. In Scotland, they are called *advocates*.

BARROWS, in ancient topography, artificial hillocks or mounts, met with in many parts of the world, and which, on being opened, are found to be repositories of the dead. When these mounts are composed of stones, they are usually distinguished by the name of *cairns*.

BARUCH, (the prophecy of,) one of the apocryphal books, subjoined to the canon of the Old Testament. Baruch was the son of Neriah, who

was the disciple and amanuensis of the prophet Jeremiah. It has been reckoned part of Jeremiah's prophecy, and is often cited by the ancient fathers as such. Josephus tells us, Baruch was descended of a noble family; and it is said in the book itself, that he wrote this prophecy at Babylon; but at what time is uncertain.

BARYTES, a very heavy mineral, common in many countries, especially in copper-mines. Formerly from its great weight it obtained the name of ponderous spar. It exhibits, when pure, the following properties. It has a sharp taste, changes vegetable blues to green, serves as an intermedium between oil and water, and in these respects it bears a strong resemblance to alkalies: when pure, it is infusible: it is between 3 and 4 times heavier than water. It will not unite with the alkalies.

BASALTES, in natural history, hard stone, chiefly black or green. The most remarkable property of this substance is its figure, being never found in strata, like other marbles; but always standing up, in the form of rectangular columns composed of a number of joints, one placed upon and nicely fitted to the other, as if formed by the hand of a skilful workman. Basaltes was originally found in columns in Ethiopia, and fragments of it in the river Tmolus, and some other places: We now have it frequently both in columns and small pieces, in Spain, Russia, Poland, near Dresden, and in Silesia: but the noblest store in the world seems to be that called the Giant's causeway, in Ireland, and Staffa, one of the western isles of Scotland. It has been considered by some as a crystalization from water, but others strenuously maintain that it is only a spe-

cies of lava. It is commonly found in the neighbourhood of volcanoes.

BASE, in chemistry, a term used to denote the earth, the alkali, or the metal of which a salt is formed in union with oxygen: thus, in the oxyde of iron or copper, the iron or copper is the base.

BASE, in architecture, is used for any body which bears another, but particularly for the lower part of a column and pedestal. The base of columns is differently formed in different orders: thus, the Tuscan base consists only of a single torus, besides the plinth: the Doric has an astragal more than the Tuscan: the Ionic has a large torus over two slender scotias, separated by two astragals: the Corinthian has two toruses, two scotias, and two astragals: the Composite has an astragal less than the Corinthian: the Attic base has two toruses and a scotia, and is proper for either the Ionic or Composite columns.

BASHAW, a dignity under the Turkish government. *Bashaw*, used absolutely, denotes the prime vizier; other bashaws, which are generally governors of provinces or cities, being distinguished by the name of the place under their command. The appellation is given by way of courtesy to almost every person of any figure at the Grand Signior's court.

BASILISC, in zoology, the trivial name of a species of lizard.

Basilisc, a fabulous kind of serpent. Kirchmayer and Van der Wiel have given the history of the basilisc, and detected the folly and imposture of the traditions concerning it. In some apothecaries' shops there are little dead animals shewn, which are said to be basiliscs: but these appear to be a kind of

bird, almost like a cock, but without feathers: its head is lofty, its wings are almost like a bat's, its eyes large, and its neck very short. As to those shown and sold at Venice, and in other places, they are only thornbacks, artificially put into a form like that of a young cock, by stretching out their fins, and furnishing them with a little head and hollow eyes.

BASILISC, a large piece of ordnance, originally so named in allusion to its form.

BASS, the lowest in the four parts of music. Of all the parts, this is the most important; and it is upon this that the chords proper to constitute a particular harmony are determined. Hence the maxim among musicians, that when the base is properly formed, the harmony can scarcely be bad.

BASSO-RELIEVO, or low-relief, is opposed to *alto-relievo*, or high-relief. Basso-relievo is a piece of sculpture where the figures or images do not protrude far beyond the body on which they are formed.

BASTILE, denotes a small castle, fortified with turrets. Such was the Bastile of Paris, which was the last castle that retained that name. This was begun to be built in 1339, by order of Charles V. and finished in 1383, under the reign of his successor. It was used as a state prison; and, in its administration, appears to have been a political inquisition.

Formerly, the Bastile was never mentioned in England unaccompanied by expressions of abhorrence: but recent circumstances have gained it so many friends on the one hand, and so many enemies on the other, that a plodding lexicographer

may scarcely venture to repeat the information that he can obtain from any source whatever. Every report is to be suspected. In the *Supplement to the Encyclopedia Britannica*, however, it is said that, the Bastile being considered as an engine of the ordinary police, not only the ministers of state, not only the magistrates, but every clerk, and even inferior officer, had in his power to procure the confinement of any individual he pleased within the walls of that prison. If this information be correct, no other evidence can be necessary to furnish a true estimate of the Bastile. It might be easy to argue the utility of intrusting to the hands of government authority to confine those whom it may know to be dangerous to its existence; but that the hands thus intrusted, should so far betray the confidence reposed, as to permit, "every petty pelting officer" to wield its sacred thunder, is a circumstance so palpably scandalous as almost to exceed belief. The Bastile in Paris was gloriously demolished on July 14th, 1789: it is not one of the least faults of Buonaparte, that instead of one, he has erected eight to confine the objects of his suspicion.

BASTION, in modern fortification, a huge mass of earth, usually faced with sods, but sometimes with brick, and, in a few instances, with stone, standing out from a rampart, whereof it is a principal part, and what, in ancient fortification, was called a bulwark.

BATH, a receptacle of water for persons to wash or plunge in, for health or pleasure. Batlis are distinguished into hot and cold; and these again are either natural or artificial. The natural hot baths

are formed of the water of hot springs, of which there are many in different parts of the world ; especially in countries where there are, or evidently have been, volcanoes. The artificial hot baths consist of either water or some other fluid, made hot by art. The cold bath consists of water, either fresh or salt, in its natural degree of heat ; or it may be made colder by art, as by a mixture of nitre, sal-ammoniac, &c. The chief natural hot baths in Great Britain are those of Bath and Bristol, in Somersetshire ; and those of Buxton and Matlock, in Derbyshire ; which latter, however, are rather warm or tepid, than hot. The use of these baths is found beneficial in diseases of the head, as palsies, &c. in cuticular diseases, as leprosy, &c. in obstructions, and constipations of the bowels, the scurvy and the stone, and in most of the diseases of women and children. The baths have performed many remedies, and are commonly used as a last resort in obstinate chronic diseases, where they succeed well, if they agree with the constitution of the patient : but whether they will agree or not, can only be known by trial.

Knight of the Bath, a title of honour in England, not hereditary, derives its origin from the days of chivalry. The order consists of the sovereign and thirty-seven knights companions. The name of "the bath" originates in a custom, said to be still continued, of *bathing*, among other preparatory solemnities. "The bath and white garment of the novice," says Gibbon, "were an indecent copy of the regeneration of baptism." The apparel of a knight of the bath is a red surcoat, lined and edged with white, girded about with a white girdle, with

out any ornament thereon; the mantle is of the same colour and lining, made fast about the neck with a lace of white silk, having a pair of white gloves tied therein, with tassels of silk and gold at the end; which mantles are adorned upon the left shoulders with the ensign of the order, being three imperial crowns, or, surrounded with the ancient motto of this knighthood, *Tria juncta in Uno* ("Three in One"), wrought upon a circle, gules, with a glory, or rays, issuing from the centre, and under it the lace of white silk heretofore worn by the Knights of the bath. They have red breeches and stockings, and white hats, with a plume of white feathers thereon.

BATTALION, a small body of infantry, ranged in form of battle, and ready to engage.

Battalion, in number, is usually from 400 to 800 men; but the number is not determined. It is divided into thirteen companies, one of which is composed of grenadiers. They are usually drawn up three men deep. Some regiments consist of but one battalion; others are divided into four or five.

BATTERING-RAM, a military engine used before the invention of gunpowder, to beat down the walls of places besieged. It consisted of a vast beam suspended to a frame, and armed at one end with a head of iron, resembling that of a ram; from the busting of which animal the idea was doubtless derived. This being equally balanced, and furnished with a number of ropes, at the extremity opposite to the ram's head, a great number of men threw it forward with violence, and thus *battered in breach*.

BATTERY, in the military art, a parapet thrown

up to cover the gunners and men employed about the guns from the enemy's shot. This parapet is cut into embrasures, for the cannon to fire through. A *battery of mortars* is sunk in the ground, and has no embrasures. *Cross-batteries* are two batteries which play athwart one another upon the same object, thus forming an angle, and beating with great effect, because, what one ball shakes the other beats down. A battery sunk or buried, is where the platform of which is sunk or let into the ground, so that there must be trenches cut in the earth, against the muzzles of the guns, for them to fire out at, and to serve for embrasures. *Battery d'enfilade*, is one that scours or sweeps the whole length of a straight line. *Battery en echarpe*, is that which plays obliquely. *Battery de revers*, that which plays on the enemy's back. *Camerade battery*, is when several guns play at the same time upon one place.

BATTERY, in electricity, is a combination of coated surfaces of glass, commonly jars, so connected together that they may be charged at once, and discharged by a common conductor. Dr. Priestley describes a complete battery. This consists of 64 jars, each 10 inches long, and $2\frac{1}{2}$ inches in diameter, all coated within an inch and a half of the top, forming in the whole about 32 square feet, of coated surface. A piece of very fine wire is twisted about the lower end of the wire of each jar, to touch the inside coating in several places; and it is put through a pretty large piece of cork, within the jar, to prevent any part of it from touching the side, by which a spontaneous discharge might be made. Each wire is turned round

so as to make a loop at the upper end; and through these loops passes a pretty thick brass rod, with knobs, each rod serving for one row of the jars; and these rods are made to communicate together by a thick chain laid over them, or as many of them as may be wanted. The jars stand in a box, the bottom of which is covered with a tin plate; and a bent wire touching the plate passes through the box, and appears on the outside. To this wire is fastened any conductor designed to communicate with the outside of the battery; and the discharge is made by bringing the brass knob to any of the knobs of the battery. When a very great force is required, the size or number of the jars may be increased, or two or more batteries may be used.

BATTERY GALVANIC, or Pile, an apparatus employed for accumulating the electricity of galvanism, which is produced by the mutual agencies of certain metallic and carbonaceous substances, and peculiar fluids. It was invented by the celebrated Volta, from whose labours the new science of galvanism has derived many advantages and much improvement.

BAVARIA, a duchy and electorate in Germany. It is the most considerable part of the circle of Bavaria, and is bounded on the north by the palatinate of Bavaria, Bohemia, and the duchy of Neuberg; on the west by Suabia, on the south by Tyrol, and on the east by the archbishopric of Saltsburg, the bishopric of Passau, and Austria. This electorate is about one hundred and twenty miles from east to west, and one hundred and five from north to south. It is watered by a great number of rivers, whereof the principal are the Inn, the Iser, and

the Lech. It contains thirty-five cities, ninety-four market towns, eight bishoprics, seventy-five convents, eleven thousand and seventy-four villages, and twenty-eight thousand seven hundred and nine churches. The air is healthy and temperate; the soil produces a little wine, some corn, and good pastures. There are likewise some mines. It was raised to the dignity of an electorate in 1623.

BAYONET, in the military art, a short three-sided dagger, formerly with a round handle, fitted for the bore of a firelock, to be fixed there after the soldier had fired; but they are now made with iron handles and rings that go over the muzzle of the firelock, and are screwed fast, so that the soldier fires with his bayonet on the muzzle of his piece, and is ready to act against the horse. This use of the bayonet fastened on the muzzle of the firelock was a great improvement, first introduced by the French, and to which, according to the chevalier Folard, they owed a great part of their victories in the last century; and to the neglect of this, in the next succeeding war, and trusting to their fire, the same author attributes most of the losses they sustained.

BAYS, in commerce, a sort of open woollen stuff, having a long nap, sometimes frized, and sometimes not. This stuff is without wale; and is wrought with two treddles, like flannel. It is chiefly manufactured at Colchester and Bocking in Essex, where there is a hall called the Dutch Bay-Hall, or Raw-Hall. This manufacture was first introduced into England by the Flemings, who being persecuted by the duke of Alba, on account of their religion, fled hither about the year of queen Elizabeth's reign.

BAZAR, or **BASAR**, also called *bezestir*, is a kind of exchange or market place among the Turks and Persians. Some of these buildings are remarkable, not only for their extent, but for their magnificence.

BDELLIUM, a gummy resinous juice, produced by a tree in the East-Indies, of which we have no satisfactory account. It is brought into Europe from the East Indies, and from Arabia. As a medicine, in which quality it is brought to market, it is better in its simple state, than when formed into any preparation. It is one of the weakest of the deobstruent gums, but it is used as a pectoral, and emmenagogue.

BEACON, any object serving as an occasional signal, or as a constant sea-mark, by means of which ships may be warned of danger, or assured of their port. The king has the exclusive power, by commission under his great seal, to cause them to be erected in fit and convenient places, as well upon the lands of the subject as upon the demesnes of the crown; and, by statute 8 Eliz. c. 13. the corporation of the Trinity-house is impowered to set up any beacons or sea marks wherever it shall think them necessary; and if the owner of the land, or any other person, shall destroy them, or shall take down any steeple, tree, or other known sea-mark, he shall forfeit 100*l.* or, in case of inability to pay it, be, *ipso facto*, outlawed.

BEADLE, from the Saxon *bydel*, a messenger of a court, who cites persons to appear and answer. This officer is sometimes called a *summoner* or *apparitor*. *Beadle* is also an officer at a university, whose chief business is that of walking before the

masters with a mace, in all public processions. There are also church-beadles, whose duty it is to preserve order, to attend the minister, and to act as messengers on parochial affairs.

BEAN, a vegetable, the seed of which is used for food. Among the ancients, many prohibitions were uttered against them, by various teachers. The reasons upon which they were thus interdicted are not clearly understood by the moderns. The precept of Pythagoras, "Abstain from beans," has been variously interpreted. It is generally supposed to have some hidden meaning. Beans were used in balloting for public offices; and hence some have imagined that Pythagoras, in reality, charged his disciples not to meddle with the affairs of the state. For whatever reason, beans appears to have been held by several nations in aversion, and even abhorrence. Cicero suggests, that they are unfavourable to tranquillity of mind.

BEARING, in navigation and geography, the situation of one place from another, with regard to the points of the compass, or the angle, which a line drawn through two places, makes with the meridians of each.

BEAVER, See *Castor*.

BEAUTY, a general term for whatever excites in us pleasing sensations, or an idea of approbation. Hence the idea annexed to beauty may be distinguished into ideas and sensations, the former of which occupy the mind; the latter affect the heart; thus an object may please the understanding without interesting the sense; and, on the other hand, we perceive agreeable sensations, excited by some objects, whose ideas are in no way related to any

thing that is praiseworthy. Beauty, as opposed to deformity, is as goodness to evil, as truth to falsehood, or as right to wrong, and may, therefore, be considered as an outward demonstration, given by the Almighty to bring us, by analogy, to the contemplation of those divine attributes, by which we are bound to regulate our lives in this material world, that we may thereby be fitted for happiness in another.

BEE, in natural history, an insect described as having a mouth furnished with jaws, and an inflected proboscis, with two bivalve sheaths; wings flat and without plaits; sting, in the female and neutral insects, concealed. The history of this insect is full of wonders, our limits will allow us to say but little. We shall begin with the new colony, which a hive sends forth about June. Before they come off, they commonly hang about the mouth of the hole, or door of the hive, for some days, as if they had not room, and were of themselves unwilling to stir. The swarm consists of three classes, one or more females, males, and drones, which are supposed to be of no sex. They commonly come off in the heat of the day, often immediately after a shower. At first they seem to fly about in great confusion, but they soon appear to be directed to some fixed place, and whenever the stand is made, they immediately repair to it till they are all collected. When they have fixed on a future habitation, they immediately begin to make their combs. The comb seems, at first, to be formed for propagation, and the reception of honey to be only a secondary use. As soon as a few combs are formed, the female bee begins laying her

eggs. From the time of laying, to the birth of the bee, the life of the maggot, and the life of the chrysalis, is shorter than in most insects. When they hatch, we find the young maggot lying coiled up in the bottom of the cell, surrounded with a transparent fluid. There is now additional employment for the labourers, viz. the feeding and nursing the young maggots. The maggots grow larger and larger till they nearly fill the cell, and by this time they require no more food, and are ready to be enclosed for the chrysalis state; when perfectly enclosed the insect begins to line the cell with a silk, which it spins out similar to the silkworm, and which makes a kind of pod for the chrysalis. Having completed this lining, they cast off the last maggot coat which is deposited at the bottom of the cell, and become chrysalises. In this state they are forming themselves for new life, and are so entirely changed, that not the smallest vestige of the old form remains.

BEG, or *begh*, pronounced *bey*, a Turkish governor. The political constitution of Turkey and its dependencies is feudal; and, every chief being thus rather a federalist than a subject, attempts at independence are frequent, and scarcely less frequently successful. In Egypt, the *Bey*s are Mamelukes, whose submission to the Porte has been always precarious. Their respect for the Sultan's Pacha, or viceroy, is but little; and especially for some years past, they have scarcely ever rendered the tribute, or revenue, required. These defalcations, it is said, have facilitated the attempt which France, as well under its monarchy, as in a republican state, has long designed to make, for obtaining this

valuable country. It is asserted, that the invasion of the French took place in consequence of an agreement made between ministers on the part of France, and a Turkish ambassador, the stipulations of which were, that the French should pay the same tribute to the Sultan as that which was expected from the Beys; and it may be presumed, that the policy of this concession rested on the consideration, that no nation could be less punctual than the Beys themselves. Several members of the divan, on their part, promised to throw no obstacle in the way of the expedition to Egypt; and a secret plan was adopted for regulating matters with the Turkish government, the whole of which, it is not pretended, had any knowledge of the transaction, not even the Sultan himself. This intrigue, it is added, being counter-intrigued by Russia and her allies, the favourers of the French lost their influence in the counsels of the Porte, a new prime vizier came into office, and the resistance that has followed was the consequence.

BELL, a well known machine, ranked by musicians among the musical instruments of percussion. The constituent parts of a bell are the body or barrel, the clapper on the inside, and the ear or cannon by which it hangs to a large beam of wood. The matter of which it is usually made is a composition called bell metal. The thickness of a bell's edges is usually $\frac{1}{3}$ of the diameter, and its height 12 times its thickness.

The sound of a bell is generally conjectured to consist in a vibratory motion of its parts, much like that of a musical chord. The stroke of the clapper must necessarily change the figure of the bell, and

of a round make it oval: but the metal having a great degree of elasticity, that part will return back again which the stroke drove farthest off from the centre, and that even some small matter nearer the centre than before; so that the two parts which before were extremes of the longest diameter, do then become those of the shortest; and thus the external surface of the bell undergoes alternate changes of figure, and by that means gives that tremulous motion to the air in which the sound consists. Bell-metal is composed of three parts of copper and one of tin.

BELLES-LETTRES, that description of literature which has a peculiar reference to matters of taste. The term is used in a very vague manner, and made, by different writers, to comprehend almost every species of literature; yet, surely, there are objects that present themselves to the mind of a man of taste, which, if they be not understood by the term *belles-lettres*, deserve some other peculiar name. Such, for instance, as can answer no other purpose than that of gratifying the elegant curiosity of *vertù*. It is intended to be inferred, that all writings connected with *vertù* belong peculiarly to *belles-lettres*. Sometimes we are told that by the *belles-lettres* is meant the knowledge of the arts of poetry and oratory; sometimes that the true *belles-lettres* are natural philosophy, geometry, and other essential parts of learning; and sometimes, that they comprehend the art of war, by land and sea: in short, they are made to include all that we know, and whatever we please. Some comprehend under the term all those instructive and pleasing sciences which occupy the memory and the

judgment, and do not make part either of the superior sciences, of the polite arts, or of mechanic professions: hence they make history, chronology, geography, genealogy, blazonry, philology, &c. the *belles-lettres*. It were an endless task to attempt to enumerate all the parts of literature which different learned men have comprehended under this title. Nor would it be of any use to the reader for us to pretend to fix the true import of the term. Whatever arts or science, it may be supposed to include, they are severally explained in the course of this work. The reader may also consult Blair's Lectures on Rhetoric and *Belles-lettres*, and Rollin on the *Belles-lettres*.

BELLOWS, a machine so contrived as to expire and inspire the air by turns, by enlarging and contracting its capacity. This machine is used in chambers and kitchens, in forges, furnaces, and founderies, to blow up the fire: it serves also for organs and other pneumatic instruments, to give them a proper supply of air. All these are of various constructions, according to their different purposes; but in general they are composed of two flat boards, sometimes of an oval, sometimes of a triangular figure: two or more hoops, bent according to the figure of the boards, are placed between them; a piece of leather, broad in the middle, and narrow at both ends, is nailed on the edges of the boards, which it thus unites together; as also on the hoops which separate the boards, that the leather may the easier open and fold again; a tube of iron, brass, or copper, is fastened to the undertmost board, and there is a valve within, that covers the hole in the underboard to keep the air from escaping.

BELTS, in astronomy, zones or girdles surrounding the planet Jupiter, brighter than the rest of his body, and terminated by parallel lines. They are observed to be sometimes broader and sometimes narrower, and not always exactly in the same part of the disc. Jupiter's belts were first observed by Huygens. Dark spots have been seen on these belts, and M. Cassini observed that one was permanent on the northern side of the most southern belt, by which he first determined the length of Jupiter's days, or the time in which he revolves upon its axis. Some astronomers suppose that these belts are seas which alternately cover and leave bare large tracts of the planet's surface: and that the spots are gulphs in those seas, and it has been alledged that the spots are the shadows of Jupiter's satellites.

BENARES, a country or subah of Hindostan, bounded on the north and north-west by Oude, on the east by Bahar, and on the south by the Orissa, about 120 miles long, and 100 broad: the principal towns are, Benares, Jionpour, Gazypour, Merzapour, and Chunar; the soil is fertile, and the country populous: it was ceded to the English in the year 1775, and produces a revenue of near 400,000*l.* a year.

BENEFICE, in the middle ages, any landed property or fee. After military fees became hereditary, these were called *feuds*, and the name *benefice* remained appropriate to the fees of the clergy. This fee is the revenue of a living, and is now styled indiscriminately a *benefice*, or a *living*. Benefices began about the year 500. The following account of those in England, is given as the fact by Dr.

Burn, viz. that there are 1071 livings not exceeding 10*l.* *per annum*; 1467 livings above 10*l.* and not exceeding 20*l.* *per annum*; 1126 livings above 20*l.* and not exceeding 30*l.* *per annum*; 1049 livings above 30*l.* and not exceeding 40*l.* *per annum*; 884 above 40*l.* and not exceeding 50*l.* *per annum*. Consequently, 5597 livings under 50*l.* *per annum*. It must be 500 years before any living can be raised to 60*l.* *per annum*, by queen Ann's bounty; and 339 years before any of them can exceed 50*l.* *per annum*. On the whole, there are above 11,000 church preferments in England, exclusive of bishoprics, deaneries, canonries, prebendaries, priest-vicars, lay-vicars, secondaries, &c. belonging to cathedrals or choristers, or even curates & well beneficed clergymen.

BENEFICE *in commendam*, is that the direction and management of which, upon a vacancy, is given, or confided to an ecclesiastic, till a proper incumbent be found.

BENEFIT of clergy, that is *benefit of learning*; a clerk formerly signifying a *literate* man. This was a privilege antiently extended to felons, who were intitled to exemption from death if they could read and write. At present, this privilege produces two descriptions of felony; the higher crimes being declared *death* without *benefit of clergy*; that is, in these cases the privilege is not allowed. Some of the lesser crimes are called *felonies with benefit of clergy*, to conviction of which sentence of death is not attached.

BENN, a kingdom of Africa, bounded on the W. by Dahomy, and the Atlantic, on the N. by Biafra, on the E. by parts unknown, and on the S. by

Loango. It extends from about 1° S. latitude to 9° N. lat. The country exhibits many beautiful landscapes; but the air is noxious and even pestilential, on account of the gross vapours exhaled from the marshes by the heat of the sun. The dress of the natives is generally neat; and indeed the women aim at variety and taste in their dress. The people are skilful in making many sorts of dies, and they manufacture and export cotton cloths. Polygamy is allowed among them, and the number of wives is limited by the state of their circumstances only. Their religion is paganism. Their king is absolute, and has a great number of petty princes under him.

BENZON. Gum Benjamin. This substance is classed, by modern chemists, amongst the balsams. There are two kinds of *benzoin*: *benzoe amygdaloides*, which is formed of white tears, resembling almonds, united together by a brown matter; and common *benzoin*, which is brown and without tears. The tree which affords this balsam is the *styrax benzoin*, from which it is obtained by incision. The *benzoin* of the shops is usually in very large brittle masses. Easily soluble in alcohol. When chewed, it imparts very little taste, except that it impresses on the palate a slight sweetness; its smell, especially when rubbed or heated, is extremely fragrant and agreeable.

BERBERIS, or Barbary tree, in botany, is a shrub rising to eight or ten feet high, well known as an ornamental shrub in our gardens. The leaves are a grateful acid; the flowers at a distance yield a pleasant smell, but very near they are rather offensive. The berries are so very acid that the birds

seldom touch them; they are used in this country as pickles and preserves. The roots of the shrub boiled in lye yield a fine yellow, which is used in Poland for dying leather: the bark, with the aid of alum, is used for the same purpose. Insects of various kinds are remarkably fond of the flowers of the barberry. The bees, in searching for honey, touch the filaments, and the anthers approximate to the stigma, and explode the pollen. Dr. Smith, our great English Linnæus, has given the following account of this curious phenomenon. "The stamens of such flowers as are open, bend back to each petal, and shelter themselves under their concave tips. No shaking of the branch has any effect on them; but if the inside of the filaments be touched with a small stick, they instantly spring from the petal and strike the anther against the stigma. The outside of the filament has no irritability, nor has the anther itself any, as may be easily proved by touching either of them with a blunt needle, bristle, &c. If the stamen be bent to the stigma, and by means of a pair of seissars applied to the anther, no contraction of the filament is produced. Hence the spring of the stamens is owing to a high degree of irritability in the side of the filament next the germ, by which, when touched, it contracts, that side becomes shorter than the other, and consequently the filament is bent towards the germ. This irritability is perceptible in all ages of the flower. If the germ be cutoff, the filaments will still contract, and nothing being in their way, will bend over quite to the opposite side of the flower. After irritation the stamens will return to their original place. The purpose of this contri-

vance is evident. In the original position of the stamens, the anthers are sheltered from rain by the concavity of the petals. Thus they probably remain, till some insect coming to extract the honey from the base of the flowers, thrusts itself between the filaments, and almost unavoidably touches them in the most irritable part: thus the impregnation of the germ is performed, and as it is chiefly in fine bright sunny weather that insects are on the wing, the pollen is also in such weather most fit for the purpose of impregnation."

BEREANS, a sect of Christians, who profess to follow the example of the ancient Bereans, in building their faith and practice upon the Scriptures alone, without regard to any human authority whatever. This is the only true principle of Christianity, to which every disciple of Christ should adhere, under all circumstances. It is this which gives value to our privileges above those of our ancestors: from them, the Bible was hidden, by existing only in an unknown language, to us the book is presented from our earliest infancy, and we shall be without excuse, if we suffer any power, any authority, to impose upon us articles of faith that are not manifest in the Scriptures.

BERYLL, a mineral, is noticed on account of its properties. It is of a green colour, in all its shades. It is crystallized in six-sided prisms, which are perfect or truncated on the edges and angles. It is nearly as hard as the topaz, and can scarcely be melted without the addition of some other substance. With borax, it melts easily. It becomes electrical by rubbing, and is found in primitive rocks, accompanied with quartz, felspar, garnet,

mica, fluor-spar, and topaz. The most beautiful specimens are brought from China and the Brazils. When pure, they are cut into rings and necklaces.

BETA, the beet root, in botany, consists of three or four species, two of which are mentioned on account of their utility. The first is the common beet-root of our gardens, which produces very large and broad leaves of red or deep purple colour. The value of these roots depend upon their size and colour. The leaves of the white beet are eaten as spinach, and the stalks are sometimes stewed and brought to table as a substitute for asparagus. A large variety of it has lately been introduced from abroad, under the title of the "root of scarcity." It is much cultivated on the continent: the leaf and root afford capital nourishment for man and cattle. It is said not to be liable to any attacks from insects, nor to be affected by drought. The leaves and root of a single plant will yield from twelve to fifteen or eighteen pounds of food.

BETULA, the *birch-tree*. The trees of this genus most commonly known, are the *birch* and the *alder*. All the betula love a moist soil. The birch is applied to an infinity of uses. A wine is drawn, by tapping, from the trunk, by the natives of Canada; and, in Europe, wine is made from the fruit of the alder. The birch, though the worst of timber, is manufactured into vessels of various domestic uses. It makes capital charcoal. The inner silken bark which peels off annually, was formerly used for writing on, before the invention of paper. In the northern climates the coarse bark is used instead of tiles or slates for the covering of houses. It is also used in certain processes of dying, and for tanning

leather. In Kamtschatka, they form the bark into hats and drinking cups. One great advantage in the birch, is, that it will grow where scarcely any thing else will thrive, and thus, almost barren land may be made to bring in a certain income of at least 20s. per acre. Broom makers are constant customers for the twigs, and hoop benders for the larger branches, and for the trunks, the turners and manufacturers of instruments of husbandry have a constant demand.

BEVEL, among masons, carpenters, &c. a kind of square, one leg whereof is frequently crooked, according to the sweep of an arch or vault. *Bevel-angle*, any other angle than those of 90 and 45 degrees.

BEY. See *Beg*.

BEZOAR, a general name for certain animal substances, supposed to be effectual in preventing the fatal consequence of poison. The bezoar spoken of in the *materia medica* is considered as a calculous concretion found in the stomach of animals of the goat kind; though some authors insist that all stones sold under this name are artificial.

BIBLE, a name applied by Christians by way of eminence to the collection of sacred writings, or the Holy Scriptures of the Old and New Testaments, known also by various other appellations, as, the Sacred Book, Holy Writ, Inspired Writings, &c.

The sacred volume, including the Old and New Testaments, is justly looked upon as the foundation of the Jewish as well as the Christian religion. The Jews, it is true, acknowledged only the Scriptures of the Old Testament, the correcting, and publishing of which, is unanimously ascribed, both

by the Jews and Christians, to Ezra. Some of the ancient fathers, on no other foundation than that fabulous and apocryphal book, the second book of Esdras, pretend, that the Scriptures were entirely lost and destroyed at the Babylonish captivity, and that Ezra restored them all again by divine revelation. What is certain, is, that in the reign of Josiah there was no other book of the law extant, besides that found in the temple by Hilkiah; from which original, by order of that pious king, copies were immediately written out, and search made for all the other parts of the Scriptures (2 Kings, XXII. ;) by which means copies of the whole became multiplied among the people, who carried them with them into their captivity. After the return of the Jews from the Babylonish captivity, Ezra got together as many copies as he could of the sacred writings, and out of them all prepared a correct edition, disposing the several books in their proper order, and settling the canon of scripture for his time. These books he divided into three parts, viz. 1. The Law. 2. The Prophets. 3. The Cetubim or Hagiographia, that is to say, The Holy Writings,

- I. The Law contains—1. Genesis. 2. Exodus. 3. Leviticus. 4. Numbers. 5. Deuteronomy.
- II. The writings of the Prophets are, 1. Joshua. 2. Judges, with Ruth. 3. Samuel. 4. Kings. 5. Isaiah. 6. Jeremiah, with his Lamentations. 7. Ezekiel. 8. Daniel. 9. The twelve minor Prophets. 10. Job. 11. Ezra. 12. Nehemiah. 13. Esther.
- III. The Hagiographia consists of, 1. The Psalms. 2. The Proverbs. 3. Ecclesiastes. 4. The Song of Solomon. This division was

made for the sake of reducing the number of the sacred books to the number of the letters in their alphabet, which amount to 22. At present, the Jews reckon 24 books in their canon of scripture, in disposing of which the Law stands as it did in the former division, and the Prophets are distributed into the former and latter Prophets.

The former Prophets are, Joshua, Judges, Samuel, Kings. The latter Prophets are, Isaiah, Jeremiah, Ezekiel, and the 12 minor Prophets. And the Hagiographia consists of the Psalms, the Proverbs, Job, the Song of Solomon, Ruth, the Lamentations, Ecclesiastes, Esther, Daniel, Ezra, the Chronicles.—Under the name of Ezra they comprehend Nehemiah.

The division of the Scriptures into chapters, as we at present have them, is of much later date. Some attribute it to Stephen Langton, archbishop of Canterbury, in the reigns of John and Henry III. But the true author of the scheme was Hugo de Sancto Caro, commonly called Hugo Cardinalis, because he was the first Dominican that ever was raised to the degree of cardinal. This Hugo flourished about the year 1240. He wrote a Comment on the Scriptures; and projected the first Concordance, which is that of the vulgar Latin Bible. The aim of this work being for the more easy finding out any word or passage in the Scriptures, he found it necessary to divide the book into sections, and the sections into subdivisions; for till that time the vulgar Latin Bibles were without any divisions at all. These sections are the chapters into which the Bible has ever since been divided. But the subdivision of the chapters was not then into verses as

it is now. Hugo's method of subdividing them was by the letters A, B, C, D, E, F, G, placed in the margin at an equal distance from each other, according to the length of the chapters. The subdivision of the chapters into verses, as they now stand in our Bibles, had its origin from a famous Jewish rabbi, named Mordecai Nathan, about the year 1445. This rabbi, in imitation of Hugo Cardinalis, drew up a concordance to the Hebrew Bible, for the use of the Jews. But though he followed Hugo in his division of the books into chapters, he refined upon his invention as to the subdivision, and contrived that by verses: this being found to be a much more convenient method, it has been ever since followed. And thus, as the Jews borrowed the division of the books of the Holy Scriptures into chapters from the Christians, in like manner the Christians borrowed that of the chapters into verses from the Jews.

BICE, or **BIZZ**, a blue colour, prepared from the *lapis armenus*. Bice bears the best body of all the bright blues used in common work, as house-painting, &c. but it is the palest in colour. It works tolerably well; but inclines a little to sandy, and therefore requires good grinding. Next to ultramarine, which is too dear for general use, it lies best near the eye, of all other blues.

BIGAMY, properly signifies being twice married; but with us is used as synonymous to polygamy, or having a plurality of wives at once. Such second marriage, the former husband or wife being alive, is simply void, and a mere nullity, by the ecclesiastical law of England; and yet the legislature has thought it just to make it felony, by reason of its

being so great a violation of the public economy, and decency of a well-ordered state.

BILE, in the animal economy, is a liquid of a yellowish green colour, and of a bitter taste, and is secreted by the liver. In most animals, considerable quantities of it are collected in the gall bladder. The principal use of the bile seems to be to separate the excrement from the chyle, after both have been formed; and to produce the evacuation of the former out of the body. These substances would, probably, otherwise mix together, and perhaps be even absorbed in the body, did not the bile combine with the excrement, and by this combination, facilitates its separation from the chyle, and thus prevents its absorption. The bile, as soon as it is mixed, with the contents of the intestinal canal, suffers a decomposition: the alkaline ingredients combine with the chyle, and render it more liquid, while its albumen and resin combine with the excrementitious matters to render them less liquid. When the resinous oil is in excess, so as not to become soluble in the bile, it crystallizes, and forms gall-stones or **BILIARY CALCULI**, which see. The retardation of bile in the substance of the liver, is the cause of various bilious or liver diseases. Bile, by its acidity, excites the peristaltic motion of the intestines, hence the bowels are always inactive when the bile is deficient in quantity, which is the case in the jaundice. It imparts a white colour to the excrements, therefore when they are white, there is certainly something amiss in the liver.

BILIARY CALCULI, or **Gall-Stones**, are concretions of bile formed in the gall-bladder, or in the duct through which the bile passes into the intestine.

canal. These concretions are of a very bitter taste, and are generally of a brown colour, so light as to float in water, and inflammable; they occasion the jaundice and other disorders; and are themselves supposed to be formed by the absorption of oxygen by the bile in its passage.

BILL OF EXCHANGE, is a letter of request, when A owing B a sum of money, B desires A to pay it to C. In common speech, such a bill is frequently called a *draft*; but *bill of exchange* is the more legal, as well as more mercantile, expression. The person, however, who writes this letter is called, in law, the *drawer*; and he to whom it is written the *drawee*; and the third person or negotiator to whom it is payable is called the *payee*.

BILL, in parliament, a paper containing certain propositions, offered to the two houses to be passed, or agreed to, by them, and then presented to the king, to pass into a law. To bring a bill into the house, if the relief sought for is of a private nature, it is first necessary to prefer a petition, which must be presented by a member, and usually sets forth the grievance desired to be remedied. This petition, when founded on facts that may be disputed, is referred to a committee of members, who examine the matter alleged, and accordingly report it to the house; and then (or otherwise upon the mere petition), leave is given to bring in the bill. In public matters, the bill is brought in upon motion made to the house, without any petition at all. When the house has agreed or disagreed to the bill as it comes from the committee, and sometimes added new amendments of its own, the bill is ordered to be engrossed, or written in a strong gross

band, on one or more long rolls (or presses) of parchment, sewed together. When this is finished it is read a third time, and amendments are sometimes there made to it; and if a new clause be added, it is done by tacking a separate piece of parchment on the bill, which is called a *ryder*. In the house of lords it passes through the same forms; and, if rejected, no more notice is taken, but it passes *sub silentio*, to prevent unbecoming altercations. The royal assent may be given in two ways. 1. In person; when the king comes to the house of peers, and sending for the commons to the bar, the titles of all the bills that have passed both houses are read, and the king's answer is declared by the clerk in *Norman-French*. If the king consents to a public bill, the clerk declares "*Le roy le veut*" ["The king is willing that it be"]; if to a private bill, "*Soit fait comme il est desire*" ["Be it as it is desired"]. If the king refuses his assent, it is done in the unassuming language, "*Le roy s'avisera*," ["The king will advise upon it"]. 2. The king may give his assent through the medium of commissioners, authorized by his letters-patent for the occasion. When a bill has received the royal assent in either of these ways, it is then, and not before, a statute, or act of parliament.

BINARY Arithmetic, that in which two figures or characters, viz. 1 and 0, only, are used: the cipher multiplying every thing by 2, as in the common arithmetic by ten: thus, 1 is one, 10 is 2, 11 is 3, 100 is 4, 101 is 5, 110 is 6, 111 is 7, 1000 is 8, 1001 is 9, 1010 is 10; being founded on the same principles as common arithmetic. This sort of arithmetic was invented by Leibnitz, who pretended

that it is better adapted than the common arithmetic for discovering certain properties of numbers, and for constructing tables.

BIRD. See *Ornithology*.

Bird catching, is practised either for the sake of singing-birds, or for those that are used as food. Water fowl are caught in prodigious numbers on the Orkneys and islands of Scotland, where the dangers of the situation, the dexterity of the adventurers, and the quantity of the prey, are equally objects of surprise. On the Feroe-islands, more especially, those characteristics are extremely remarkable. The cliffs which contain the objects of search are often two hundred fathoms in height. They are assaulted from above and below. In the first case, the fowlers provide themselves with a rope 80 or 100 fathoms in length. One of the party fastens one end about his waist and between his legs, recommends himself to the protection of the Almighty, and is lowered down by six others, who place a piece of timber on the margin of the rock, to prevent the rope from wearing against the sharp edge. They have, beside, a small line fastened to the body of the adventurer, by which he gives signals that they may lower or raise him, or shift him from place to place. The last operation is attended with great danger, by the loosening of the stones, which often fall on his head, and would infallibly destroy him, was he not in some degree protected by a strong thick cap; but even that is found unequal to shield him against the weight of the larger fragments of rock. The skill and agility of the fowlers is amazing; they will place their feet against the front of the precipice, and

dart themselves some fathoms from it; with a cool eye survey the places where the birds nestle; and again spring into their haunts. In some instances, the birds lodge in deep recesses. The fowler will alight there, disengage himself from the rope, fix it to a stone, collect the booty, fasten it to his girdle, and at his leisure resume his pendulous seat. At times, he will again shoot from the rock, and, so doing, with a fowling-net placed at the end of a staff, catch the old birds that are flying to and from their retreats. When he has finished his daring enterprise, he gives a signal to his friends, who pull him up, and share the hard-earned profit. The feathers are preserved for exportation. The flesh is partly eaten fresh, but the greater portion dried for winter's provision. The fowling from below has its share of danger. The party goes on the expedition in a boat; and when it has gained the base of the precipice, one of the boldest, having fastened a rope about his waist, and furnished himself with a long pole with an iron hook at one end, either climbs, or is thrust up by his companions, who hoist him, by means of a pole, to the next footing-spot he can reach. He, by means of the rope, brings up one of the boat's crew; the rest are drawn up in the same manner; and each is furnished with his rope and fowling-staff. They then continue their progress upward in the same manner, till they arrive at the region of the birds, and wander about the face of the cliff in search of them. They then act in pairs. One fastens himself to the end of his associate's rope, and in places where birds have nestled beneath his footing, he permits himself to be lowered down, depending for

his security on the strength of his companion who has to haul him up again. They fling the fowl into the boat, which attends their motions. They often pass seven or eight days together in this employment, and lodge in the crannies which they find in the face of the rocks.

Bird-lime, a viscid substance, which being smeared on twigs detains such small birds as alight upon it. The most common birdlime is made from holly-bark.

Birds-nests, in cookery, the nest of the *hirundo esculenta* or Indian swallow, very delicately tasted, and frequently mixed among soups. On the sea-coasts of China, at certain seasons of the year, there are seen vast numbers of these birds. They leave the inland country at their breeding time, and come to build in the rocks, and fashion their nests out of a matter which they find on the shore, washed thither by the waves. The nature of this substance is scarcely yet ascertained: According to *Kempfer*, it is mulluscs or sea-worms; according to *Me. le Poivre*, fishspawn; according to *Dalrymple*, sea-weeds; and according to *Linnaeus*, it is the animal substance frequently found on the beach, which fishermen call blubbers or jellies. The nests are of an hemispheric figure, and of the size of a goose's egg, and in substance much resemble the *ichthyocolla* or isinglass. The Chinese gather these nests, and sell them to all parts of the world; they dissolve in broths, &c., and make a kind of jelly of a very exquisite flavour.

BIRMAN EMPIRE comprises the kingdoms of Ava and Pegu, in the country formerly called India beyond the Ganges. The subjects of this empire are about 15 millions.

BISHOP, a prelate, or person consecrated for the spiritual government and direction of a diocese. The word comes from the Saxon *bischof*, and that from the Greek *episcops*, an overseer or inspector, which was a title given by the Athenians to those whom they sent into the provinces subject to them, to look into affairs. The Romans gave the same title to those who were inspectors of the bread and provisions. It appears from a letter of Cicero, that he himself had a bishopric, being *episcopus Ora et Comptis*. In England, the king being certified of the death of a bishop by the dean and chapter, and his leave requested to elect another, the *conge d'elire* is sent to them with a letter missive, nominating the person whom he wishes to be chosen. The election is to be within twelve days after the receipt of it; otherwise the king, by letters patent, appoints whom he pleases; and the chapter, in case of refusing the person named by the king, incurs a *premunire*. All bishops in England are peers of the realm, with the exception of the bishop of Man; and as such sit and vote in the house of lords, and claim all the privileges enjoyed by the temporal lords, excepting that they cannot be tried by their peers, because, in cases where life is concerned, they cannot, on account of the prohibition of the canon law, vote upon the trial. They have the titles of lords, and *right reverend fathers in God*.

BISNET, a sort of bread much dried, to make it keep for sea service. For long voyages, they prepare it six months before the embarkation. It will hold good a whole year.

BISMUTH, or *tin-glass*, one of the brittle metals, of a reddish or yellowish-white colour and a lamel-

lated texture, and moderately hard and brittle ; so that it not only breaks into pieces under the strokes of the hammer, but may even be beat into powder. Bismuth is more commonly found in a native state than any other semi-metal. Most metallic substances unite with bismuth, and are thereby rendered more fusible than before ; hence it is used in making solder, printer's types, pewter, &c.

BISSEXTILE, or Leap-Year, a year consisting of 366 days, and happening every fourth year, by the addition of a day in the month of February, which that year consists of 29 days. And this is done to recover the six hours which the sun takes up nearly in his course, more than the 365 days commonly allowed for it in other years. See **CHRONOLOGY**.

BISTRE, the burnt oil extracted from the roset of dry beech-wood, used in drawing, as a brown colour. It is seldom to be had in such a state as to wash freely. Its general fault is grittiness, or the admixture of an over-abundance of gum in the preparation, which is an artifice to procure that adhesion which its sandy texture resists. If well prepared, the goodness next to be required is a warm deep-brown colour.

BITUMENS, oily matters of a strong smell, and of different consistencies, which are found in many places within the earth.

BLACK, a well-known colour, supposed to be owing to the absence of light, most of the rays falling upon black substances being not reflected but absorbed. In proof and illustration of this hypothesis it is observed, that " one and the same body assumes different degrees of blackness, according

to the disposition of the sensible part of its surface ; and in this respect there is not perhaps any other colour which is so much affected by an apparent mechanism. Thus, black velvet, when the pile is raised, appears intensely black ; much more so than the silk it was made from ; but on pressing the pile smooth it looks pale, and in certain positions shows somewhat even of a whitish cast." The explanation is, that " When the surface is composed of a multitude of loose filaments, or small points, with the extremities turned toward the eye, much of the light is stifled among the interstices between them, and the body appears dark : when the filaments are pressed close, and the surface smoothed and polished, more of the light is reflected from it, and the intenseness of the blackness is diminished."

—That a black surface is a more or less intensely black, according to the manner in which it receives the light, is doubtlessly true ; but, many objections present themselves against this theory, if it be offered as explanatory of the cause or origin of that colour which we call black. All the remarks that are here offered might be made upon crimson, or blue, or green velvet, as upon black ; and consequently the same conclusion might be drawn, that these colours are owing to the absence of light. All the colours, in their most concentrated or intense state, assume the appearance of black : and we do not discover our mistake without dilution or contrast. Very frequently that which seems black is found, on contrast with blue, to be brown, or, on contrast with brown, blue. That colour is allowed to be a real black, which on dilution is a real grey. Now, it is known, that a perfect grey may be produced

by the due mixture of yellow, red, and blue; and a concentrated, intense, or deep grey, being a true black, it seems reasonable to found upon these premises, an assertion that black is a colour produced upon the same combining principle that renders blue and red a purple; and to be compounded of yellow, red, and blue in a concentrated state, and in such proportions as to prevent the preponderance of either.

BLACK-LEAD, otherwise called **plumbago** and **graphites**. A mineral substance used in the making of pencils, in forming a composition for crucibles, and in covering the surface of iron utensils to preserve them from rust and give them a good appearance. It has a dark iron-black colour, a metallic lustre, and a thin slaty fracture: it is found in separate loose pieces of a fine grain, which are very soft, and leave, as is well known, strongly-coloured traces on paper by friction. Its specific gravity varies from 1.9 to 2.2. "It suffers no change even by the most violent heat, if exposed to it in closed vessels, neither does it melt, but if it be roasted with a strong and continued heat, and air be admitted, the greatest part of it disappears, leaving behind a small portion of oxide of iron." This substance was formerly thought to contain lead, as two of its names obviously indicate, but it is now discovered by analysis to be a compound of carbon and iron, in the proportion of about nine parts of the former to one of the latter; and therefore in modern chemical language it has received the more appropriate name of **CARBURET of iron**.

Blacking, is sometimes used for a factitious black, as lamp-black, shoe-black, &c. A mixture

of ivory or lamp-black with linseed oil makes the common blacking. For a shining blacking, small beer or water is used instead of oil, in the proportion of about a pint to an ounce of ivory-black, with the addition of half an ounce of brown sugar and as much gum-arabic. The white of an egg substituted for the gum, gives the blacking more gloss, but is supposed to hurt the leather and render it apt to crack.

BLANC-MONT, a stupendous mountain in Savoy, the highest of the Alps, and encompassed by those wonderful connexions of snow and ice called the Glaciers. Of these glaciers there are five, which extend almost to the plain of the vale of Chamouni, and are separated by wild forests, corn-fields, and rich meadows; so that immense tracts of ice are blended with the highest cultivation, and perpetually succeed to each other in the most singular and striking vicissitude. All these several valleys of ice, which lie chiefly in the hollows of the mountains, and are some leagues in length, unite together at the foot of Mont-Blanc; the highest mountain in Europe, and probably of the ancient world. It was reckoned that the summit of this mountain was inaccessible, before Dr. Paccard, a physician at Chamouni, attempted to reach it in August 1786, and succeeded in the attempt. Soon after, the same undertaking was resolved upon and accomplished by M. de Saussure, who published a narrative of the journey.

This excellent naturalist states that the summit of the mountain is a ridge nearly horizontal, lying east and west; the slope at each extremity is inclined from 28 to 30-degrees, the south side between

15 and 20, and the north about 40 or 50. This ridge is so narrow as scarcely to allow two people to walk abreast; especially at the west end, where it resembles the roof of a house. It is wholly covered with snow; nor is any bare rock to be seen within 150 yards of the top. The surface of the snow is scaly, and in some places covered with an icy crust, under which the snow is dusty and without consistence. The highest rocks are all granites; those on the east side are mixed with steatites; those on the south and the west contain a large quantity of schorl; and a little lapis cornuus. Some of them, especially those on the east, which are about 150 yards below the summit, seem to have been lately shivered with lightning.

M. de Saussure saw no living animal on the mountain except two butterflies, which he supposes must have been driven thither by the wind. Lichens are the only vegetables which are found on the more elevated parts of these mountains: the *silene acaulis*, which grows in great quantities on the lower parts; disappears at the height of about two miles above the level of the sea.

BLAST, in agriculture and gardening, is by some attributed to cold: by others to a want of a due supply of sap; by others to ascending fumes of the earth; by others to sharp winds and frosts; immediately succeeding rains. That species called *uredines*, or *fire-blasts*, is supposed, by Mr. Hales, owing to the solar rays reflected from or condensed in the clouds, or even collected by the dense steams in hop-gardens and similar places.

BLASTING, among miners, a term for the tearing up rocks, which they find in their way, by gun-

powder. The method of doing it is this: they make a long hole like the hollow of a large gun-barrel in the rock they would split; this they fill with gun-powder; then they firmly stop up the mouth of the hole with clay, except a touch-hole, at which they leave a match to fire it.

BLASTING OF WOOD, the rending in pieces logs of wood, such as roots of trees, &c. by means of gun-powder. A method has been lately described by Mr. Knight, which is simple and easily effected. The instrument used is a screw, with a small hole drilled through its centre. The head of the screw is formed into two strong horns, for the more ready admission of the lever with which it is to be turned, and a wire, for the purpose of occasionally clearing the touch-hole. When a block of wood is to be broken, a hole is to be bored with an augre to a proper depth, and a charge of gun-powder introduced. The screw is to be turned into the hole till it nearly touches the powder; a quick match is then to be put down the touch-hole till it reaches the charge. The quick match is eighteen inches long, to afford the operator an opportunity of retiring, after lighting it, to a place of safety: it is made by steeping a roll of twine or linen thread in a solution of salt-petre.

BLAZON OR BLAZONRY, in heraldry, the art of decyphering the arms of noble houses, or of naming all the parts in their proper order and particular terms.

BLEACHING, or the art of whitening linen, &c. has, within the course of a few years, received, through the medium of chemistry, very considerable improvements. The common method is to

expose the articles to be bleached in the open air, to saturate them with water, to leave them to the action of the atmosphere, and to apply an alkaline ley. When the muriatic acid had been discovered, and a method by which it might be impregnated with oxygen; and when it was farther perceived that the oxymuriatic acid deprived vegetables of their colour, and in so doing parted with its oxygen, it occurred to M. Berthollet, that this acid might produce the same effect upon those particles which give colour to thread as cloth, and which is the object of bleaching to destroy. He reflected upon the circumstances of common bleaching, and endeavoured to imitate its process, because he thought the oxygenated muriatic acid might act in the same manner as the exposition of the cloth in the meadows, which alone does not suffice, but appears to dispose the colouring parts of the cloth to be dissolved by the alkali of the ley. He examined dew, not only that which falls from the atmosphere, but also that which comes from the nocturnal transpiration of plants; and he observed that both were impregnated with oxygen sufficient to destroy the colour of paper slightly tinged with *turnsol*. On these principles, he employed leys, and the oxygenated muriatic acid, alternately.—The theory of the new bleaching, it follows, is this: that air and water naturally, and the acid artificially, by communicating oxygen, render the colouring matter soluble in alkali. Another part, but not the whole of the colouring matter, which is principally composed of carbon and hydrogen, yielding to alkali alone. Wool and silk are bleached by different processes.

BLOCKADE, in military affairs, the blocking up a place, by posting troops at all the avenues leading to it, to keep supplies of men and provisions from getting into it; and by these means proposing to starve it out, without making any regular attacks. To *raise a blockade*, is to force the troops that blockade to retire.

BLOOM, a mass of iron, that has undergone the first hammering.

BLOCKS, the usual name, on board ship, for pullies. The *blocks* now used in the navy are made in Portsmouth by means of circular saws and other machinery, which have been lately erected by a most ingenious mechanic. This machinery performs the several operations from the rough timber to the perfect *block*, in the completest manner possible. The whole is worked by means of a steam engine; the manual labour required is simply to supply the wood as it is wanted to the several parts of the machinery, so that the commonest labourer almost may be made to act in this business with very little instruction.

BLOOD. A red homogeneous fluid, of a saltish taste, and somewhat urinous smell, and glutinous consistence, which circulates in the cavities of the heart, arteries and veins. The quantity is estimated to be about twenty-eight pounds in an adult: of this, four parts are contained in the veins, and a fifth in the arteries. The colour of the blood is red; in the arteries it is of a florid hue, in the veins darker, except only the pulmonary veins, in which it is of a lighter cast. Physiology demonstrates, that it acquires this florid colour in passing through the lungs, from the oxygen it absorbs.

BLOOD-HOUNDS, a variety of the dog genus and species. From the accuracy of their scent these animals have in various countries and different ages been employed to trace certain descriptions of persons, whose effluvium, either direct or collateral, infallibly betrayed them. In the West Indies they have, for the last century and half, been solely employed in hunting the Maroons or mixed breed of natives; to make them accurate in which they undergo a system of preparatory education. The Spanish colonists have the first disgrace of having commenced this brutal mode of warfare, and the English colonists the second disgrace of having copied from them. Some few centuries ago blood-hounds were common in our own country, and like other hounds, confined to the pursuit of deer, foxes, or hares, or employed in the custody of sheep. The accuracy with which they were able to trace the scent of the first and last, made them admirable coadjutors in the detection of deer or sheep stealers; about whose persons the effluvia of the stolen animals hang for a long period of time, and of which it is extremely difficult for them to divest themselves. There can be no doubt that a variety of culprits were formerly detected by this method; and hence originated the absurd belief and vulgar prejudice that *blood-hounds* could ascertain by their scent, not only deer and sheep stealers, but robbers, murderers, and depredators of every description.

BLOW-PIPE, in chemistry and mineralogy, a wind instrument for the purpose of increasing the heat of a candle or lamp, in the same manner as a pair of bellows is employed for raising the temperature of a common fire or furnace. It is not known

at what time, or by whom, this very useful instrument was invented; but it appears to have been employed by glass-workers, enamellers, and jewellers long before it was adopted as an article of chemical apparatus.

A blow-pipe very frequently used consists of five parts: the mouth-piece, a plain tube, a bulb, a curved tube, and a nut. The mouth-piece is made of ivory, the rest of the apparatus being of brass, and fits closely into the pipe so as to be air-tight; the bulb is divided into two hemispheres, which screw into each other; into the lower hemisphere is fixed a recurved tube, in such a manner as to prevent the condensed vapour from escaping out of the bulb; the nut is a hollow cylinder sufficiently wide at one end to receive the extremity of the curved tube, and perforated at the other with a small round hole, to allow a passage for the air: each blow-pipe has generally three of these nuts, with apertures of different sizes, the largest of which does not exceed the diameter of a small pin.

The use of the blow-pipe, both to the artist for the purpose of enamelling, of softening and soldering small pieces of metal, and in the fabrication of glass instruments, and to the chemist and mineralogist in the examination of substances, and in various domestic operations, is very important. When small portions of any mineral or metal are intended to be fused, they are laid either in a cavity made in a lump of charcoal, or in a spoon made of silver or platinum; and are thus exposed to the action of flame urged by the blow-pipe. The strongest heat of this flame is at the point of the luminous bluish cone, which may be observed sur-

rounded by another of a white and more faint appearance.

BLUE, one of the seven colours into which the rays of light divide themselves when refracted through a glass prism. The principal blues used in painting are prussian-blue, bice, saunders-blue, azure or smalt, and verditer. In dying, the principal ingredients for giving a blue colour are indigo and woad. Bishop Watson, in his *Essays*, vol. 1, has related an experiment by which he produced one of the most vivid blues he ever saw. Into a solution of green vitriol (sulphate of iron) he poured an infusion of raspings of heart of oak in hot water, and the colour just mentioned was instantly formed. If the raspings be boiled for an hour in water they lose their property; and if the solution of vitriol be poured upon the dry raspings, the whole is changed into a blue mass.

BOAT-LIFE, see **LIFE-BOAT**.

BOATSWAIN, the officer who has the boats, sails, rigging, colours, anchors, and cables committed to his charge. It is particularly the duty of the boatswain to direct whatever relates to the rigging of a ship, after she is equipped from a royal dock-yard. It is likewise his office to summon the crew to their duty; to assist with his mates in the necessary business of the ship, and to relieve the watch when it expires; he is directed by his instructions to perform his duty with as little noise as possible.

Body, in physics, or natural philosophy, a solid, extended, palpable substance; of itself merely passive, being indifferent either to motion or rest, yet capable of any sort of motion or figure.

Body, in geometry, is a figure conceived to be

extended in all directions, or what is usually said to consist of length, breadth, and thickness; being otherwise called a solid. A body is conceived to be formed or generated by the motion of a surface, like as a surface by the motion of a line, and a line by the motion of a point.—Similar bodies, or solids, are in proportion to each other, as the cube, of their like sides, or linear dimensions.

BODIES (Regular or Platonic,) are those which have all their sides, angles, and places, similar and equal.

Of these there are only 5; viz. the tetraedron, contained by 4 equilateral triangles; the hexaedron or cube, by 6 squares; the octaedron, by 8 triangles; the dodæcadron, by 12 pentagons; and the icosaedron, by 20 triangles. To find the superficies or solidity of the regular bodies,

1. Multiply the proper tabular area (taken from the following table) by the square of the linear edge of the solid, for the superficies.

2. Multiply the tabular solidity by the cube of the linear edge, for the solid content.

Table of the Surfaces and Solidities of the five Regular Bodies, the linear edge being 1.

<i>No. of Faces</i>	<i>Names</i>	<i>Surfaces</i>	<i>Solidities</i>
4	Tetraedron	1.73205	0.11785
6	Hexaedron	6.00000	1.00000
8	Octaedron	3.46410	0.47140
12	Dodecaedron	20.64573	7.66312
20	Icosaedron	8.66025	2.18169

BOHEMIA, a kingdom of Europe, in Germany, bounded on the north by Lusatia and Upper Saxony, on the east by Moravia and Silesia, on the

south by Bavaria, and on the west by Franconia. Although this country is situated in the middle of Germany, and its king be an elector of the empire ; nevertheless, it has its particular assemblies, customs, and language, different from the Germans. The name Bohemia, in the German language, signifies the home or abode of the Boii, a people of ancient Gaul, who under their leader Segovesus, settled in that country about 590 years before the Christian era. These Boii were soon after expelled by the Marcomanni, a nation of the Suevi, who were afterwards subdued by the Sclavi, a people of Scythia, whose language is still spoken in Bohemia and Moravia. Notwithstanding the expulsion of the Boii, the present inhabitants are still called Bohemians by foreigners, but the natives call themselves Czekowe, or Czechs. At first they were governed by dukes, but the emperor Otho I. conquered the duke of Bohemia, and reduced the province under the empire. Afterwards Henry V. gave the title of king to Ladislaus, duke of Bohemia ; and since that time these kings have been electors and chief cup-bearers of the empire, and the kingdom has been elective ; which privileges have been confirmed by the golden bull.

BOILING, or **Ebullition**, the bubbling up of any fluid. The term is most commonly applied to that bubbling which happens by the application of caloric, though that which ensues on the mixture of an acid and alkali is sometimes also distinguished by the same name. Boiling, in general, is occasioned by the discharge of an elastic fluid through that which is said to boil ; and the appearance is the same, whether it is common air, fixed air, or steam,

that makes its way through the fluid. The boiling of water is occasioned by the lowermost particles being rarefied into vapour by reason of the vicinity of the bottom of the containing vessel to fire. In consequence of this, being greatly inferior in specific gravity to the surrounding fluid, they ascend with great velocity, and, agitating the body of water in their ascent, give it the tumultuous motion called boiling.

Every particular liquid has a fixed point at which boiling commences, and this is called the boiling point of the liquid. Thus water begins to boil when heated to 212 degrees. After a liquid has begun to boil, it never becomes hotter, however strong the fire may be to which it is exposed. A strong heat, indeed, makes it boil more rapidly, but does not increase its temperature. This fact was first observed by Dr. Hooke. The following table shows the boiling point of a number of liquids :

<i>Bodies.</i>	<i>Boiling point.</i>			
Æther - - -	-	-	-	98
Ammonia - - -	-	-	-	140
Alcohol - - -	-	-	-	176
Water - - -	-	-	-	212
Muriat of lime - - -	-	-	-	230
Nitric acid - - -	-	-	-	248
Sulphuric acid - - -	-	-	-	590
Phosphorus - - -	-	-	-	554
Oil of Turpentine - - -	-	-	-	560
Sulphur - - -	-	-	-	570
Linseed oil - - -	-	-	-	600
Mercury - - -	-	-	-	660

The boiling point however is found to depend on the degree of pressure to which the liquid is ex-

posed. If the pressure is diminished, the liquid boils at a lower temperature, if it is increased, a higher temperature is necessary to produce ebullition. From the experiments of professor Robison, it appears that, in a vacuum, all liquids boil about 145 degrees lower than in open air, under a pressure of 30 inches of mercury: therefore water would boil in vacuo at 67 degrees, and alcohol at 34 degrees. In Papin's digester, the temperature of water may be raised to 300 degrees, or even 400 degrees without ebullition; but the instant that this pressure is removed, the boiling commences with prodigious violence.

BOLES, are viscid earths, less coherent and more friable than clay, more readily uniting with water, and more freely subsiding from it. They are soft and unctuous to the touch; adhere to the tongue, and by degrees melt in the mouth, impressing a slight sense of astringency. There are a great variety of these earths; and they are sometimes used medicinally, in fluxes and complaints of the *primæ viæ*. 1. Armenian bole, of a bright red colour. 2. French bole, of a pale red. 3. Bole of Blois, yellow. 4. Bohemian bole, yellow. 5. Lemnian earth, pale red. 6. Silesian bole, pale yellow.

BOMB, a large shell of cast iron, filled with a cement compounded of quicklime, ashes, brickdust, and steel filings, worked together in a glutinous water or prepared liquid. The shell has a vent, by which a fusee is introduced, which is so calculated, as that, being lit previous to the discharge of the bomb, it shall communicate with the contents about the time of its descent. The bomb is thus contrived to annoy the enemy, partly by the weight

with which it falls, but more by the destruction it may scatter in bursting.

Bomb-vessel, small ships, adapted to throwing bombs into fortresses on the sea-shore. They are said to have been first used at the siege of Algiers; before which enterprize it was never thought practicable to carry on a bombardment from the sea.

BOMBASINE, a name given to two sorts of stuff; the one of silk, and the other crossed with fine worsted.

BOMBAST, in literary composition, is a stile either too lofty for the occasion, or one, in which a writer, from deficiency in taste, mistakes unwieldiness for magnificence.

BOMBAY, an island on the west coast of the peninsula on this side the river Ganges, in the East Indies, about seven miles long, and 20 in circumference. This island came into the possession of the English (in whose hands it has ever since continued) by the marriage of Charles II. with Catharine, infanta of Portugal. The ground is barren, yielding little else beside cocoa-nuts. Good water is exceedingly scarce; and the air is not very healthy. The inhabitants are numerous, amounting to about 60,000. The factory, and those depending upon them, are now a corporation, and governed by a mayor and aldermen, as in England.

BOND, in law, a deed whereby the obligator obliges himself to pay a certain sum of money agreeably to the terms of the bond. This is a simple bond; but in general, a bond is an engagement to perform certain stipulations, therein mentioned under pain of forfeiting a certain sum or penalty. If the stipulation is the payment of money, the p

nalty to be incurred by non-fulfilment, is generally double the sum for the payment of which the bond is given.

Bones (Analysis of.) As chemistry is inexhaustible in its objects, so it is indefatigable in its researches, and especially within the last fifty years has laid, as it were, all nature under tribute. Hence the bones of various animals, and even those of man himself, have been subjected to experiment. Many of the products afforded by the combustion and distillation of bone, such as bone-ash, lamp-black, ammonia, &c. have been long known, and employed in the arts. From the analysis of bones we learn that, although the proportion of ingredients varies in the bones of different animals, the general constituents of bone are as follow: 1. Gelatin, soluble by boiling rasped or bruised bones in water, and giving a fine clear jelly; 2. Oil or fat, separable during the boiling, by rising to the top of the water, and when cold concreting into a suet; 3. Phosphat of lime, soluble in dilute nitrous, muriatic, or acetous acid, and precipitable thence by pure ammonia; 4. Some sulphat of lime; 5. A little carbonat of lime; and, 6. A membranous or cartilaginous substance, retaining the form of the bone after every thing else has been extracted by water and an acid. Of these ingredients the phosphat of lime exists in far the greatest abundance, amounting in different bones to between 52 and 85·5 parts in 100 of the whole. To the gelatin is owing the property which bones are well known to possess of contributing to the richness of soups, and even, when properly boiled, of making soup by themselves.

Bones, are very useful articles for making different kinds of toys, and also in several of the chemical arts, as for making cast iron malleable, for absorbing the sulphur of sulphurous ores, for forming tests and coppels, or vessels for refining gold and silver with lead; for burnt bones compose a mass of a porous texture, which absorbs vitrified lead and other metals, while the unvitrescible gold and silver remain entire behind. They are used for the preparation of milky glasses and porcelains, for the rectification of volatile salts, and of empyreumatic oils, and for making glue. The bones of different animals are not equally fit for different uses. The bone of the cuttle-fish is used by goldsmiths for making moulds; those of bullocks for painters' black; also, in lieu of ivory, for toys and cutlers work.

BOOKSELLER, one who trades in books, whether he prints them himself, or gives them to be printed by others. Among us, they are the same with bibliopolæ among the ancients, whose office was distinct from that of librarii. Petty dealers, or venders of small ware, like some with us, were more particularly denominated libelliones. At Rome, the Argiletum was the mart of books, as Paternoster-row; and St. Paul's Church-yard, still are in London. Booksellers in many places are ranked among the members of universities, and entitled to the privileges of students: as at Tubingen, Salzburg, and Paris, where they have always been distinguished from the vulgar and mechanical traders, and favoured by an exemption from divers taxes.

Formerly, the offices of bookseller and printer

were united in the same persons. Labbé gives a list of learned booksellers; most of whom were also authors. Of late, booksellers have drawn their business into less compass, and, leaving the labour of composing books to one set of persons, and that of printing them to another, content themselves with the gainful part; thus ministering to the republic of letters not with the head or the hand, but the purse only. In this view, they have been very important and useful agents between authors and the public; and have contributed in no small degree to the encouragement of genius and literary industry, and the diffusion of science. There are few authors who have undertaken the printing and publishing of any work likely to be transmitted to posterity, without being connected with some bookseller, or booksellers, eminent in the trade.

BOOKSELLER'S marks : An acquaintance with the bookseller's marks or signs, expressed on the title pages of their books, is of some use; because many books, especially in the century before the last, have no other designation, either of printer, bookseller, or even city. The anchor is the mark of Raphelengius at Leyden; and the same with a dolphin twisted round it, of the Manutii at Venice and Rome; the Arion denotes a book printed by Oporinus at Basil; the caduceus, or pegasus, by the Wecheluses at Paris and Francfort; the cranes, by Cramoisy: the compass, by Plantin at Antwerp; the fountain, by Vascosan at Paris; the sphere in a balance, by Janson or Blaew, at Amsterdam; the lily, by the Juntas at Venice, Florence, Lyons, and Rome; the mulberry-tree, by

Morel at Paris ; the olive-tree, by the **Stephenses** at Paris and Geneva, and the **Elzeviers** at Amsterdam and Leyden ; the bird between two serpents, by the **Frobeniuses** at Basil ; the truth, by the **Commelins** at Heidelberg and Paris ; the Saturn, by **Colinæus** ; the printing press, by **Badius Ascencius**, &c.

BORACIC ACID, the sedative salt of Homburg, is obtained from the mineral called borax, which consists of this acid in conjunction with soda. The acid, when separated, appears in the form of a white, scaly, glittering salt, with hexahedral scales ; soft and unctuous to the touch. Its taste is bitterish, with a slight degree of acidity. It is soluble in alcohol, which it causes to burn, when set on fire, with a green flame surrounded with a white one. It is of difficult solubility in cold water, but is readily dissolved by boiling water. It is not altered by exposure to the air ; nor is it volatilized by fire, but by aqueous vapour, it may be mechanically raised up ; a strong heat fuses it into a transparent glass, which has a great tendency to dissolve the clay of the crucible. By this melting it undergoes no farther change than the loss of its water of crystallization. This acid has no action on combustible bodies : its composition is at present unknown.

BORAX, which, in the new chemistry, is called a sub-borate of Soda, being a compound of Soda and Boracic Acid (see above) is a species of white salt much used in various manufactures. It is found chiefly in Thibet.

BORNEO, an island of the East-Indies, of a nearly circular form, and supposed to be the largest in

the world, except New Holland, being about 2,500 miles in circumference. It was discovered by the Portuguese in 1521. The inland country is very mountainous. It abounds with gold; and the finest diamonds of the Indies are found in its rivers, being probably washed from its hills by torrents. Here are also mines of iron and tin, and leadstones. The beasts are oxen, buffaloes, deer, goats, elephants, tigers, and monkeys. From April to September this country is frequented by heavy rains, attended with violent storms of thunder and lightning. The inhabitants on the sea-coast are generally Mahometans; but those of the inland parts of the country are pagans. It is situated directly under the equinoctial line.

BOROUGH, such town or village as sends burghesses or representatives to parliament. Boroughs are equally such whether they be incorporate or not; there being several boroughs that are not incorporated, and, on the contrary, several corporations that are not boroughs; *e. gr.* Kingston, Deal, Kendal, &c.

BOROUGH, *English*, a customary descent of lands or tenements, in certain parts of our country, by which they descend to the youngest instead of the eldest son. The custom goes with the land, although there be a devise at the common law to the contrary. The reason of this custom is, because the youngest is presumed in law to be the least able to provide for himself.

BORROWING, when money, corn or other commodity, merely esteemed according to its price, be borrowed, it is repaid by returning an equal quantity of the same thing, or an equal value in money.

If money is borrowed it is always understood that interest is payable, and is by law demandable ; but when a house, or a horse, &c. is borrowed, the restoration of the identical property is always understood, and if a thing be used for any other purpose, than that for which it is borrowed, or if it be lost, the party lending may have his action on the case for it.

BORSEHOLDER, among the Anglo-Saxons, one of the lowest magistrates, whose authority extended only over one tithing consisting of ten families. Each tithing formed a little state of itself, and chose one of its most respectable members for its head, who was called a borseholder, a term derived from two words signifying a "surety" and a "head" or "chief."

BORYSTHENES, a large river of Scythia falling into the Euxine sea : it is now called the Dnieper, and is inferior to no European river but the Danube. The name of this river signifies a rampart formed by a forest of pines, because the shores of the Borysthenes were lined with forests of pines.

BOSHMEN, a class of Hottentots, who, like the Maroon Negroes in the West Indies, live without laws and without any discipline : they are a sort of land-pirates who have no resources but plunder. Their name signifies *bush-men*, or men of the woods, and under this appellation the inhabitants of the Cape of Good Hope distinguish all those malefactors who desert from the colonies to avoid the punishment due to their crimes.

BOSPHORUS, a narrow sea, which, from the derivation of the words, is supposed to be no wider than what a bullock can swim over. It is also a

sea separating two continents, and by which two seas, or a gulph and a sea, are made to communicate. The word is usually applied to the Straits of Constantinople, called the Bosphorus of Thrace.

BOTANY, the science of plants. It teaches their natural history and intrinsic qualities ; and, to facilitate an acquaintance with these particulars, arranges all vegetables in classes, orders, and other subdivisions. This arrangement is called a system. Various systems, or plans of arrangement, have been from time to time proposed ; but the sexual system of Linnæus is at present generally received. This naturalist has drawn a continued analogy between the vegetable economy and that of the animal ; and has derived all his classes, orders, and genera, from the number, situation, and proportion of the parts of fructification. In twenty-four *classes*, he has comprehended every known genus and species. In considering a plant with a view to its characteristics or distinguishing features, it is divided by Linnæus into the following parts, making so many outlines, to which the attention of the botanical observer must be directed : 1. Root ; 2. Trunk ; 3. Leaves ; 4. Props ; 5. Fructification ; 6. Inflorescence. 1. The *root* consists of two parts, the *caudex* and the *radicula*. The *caudex*, or stump, is the body or knob of the root from which the trunk and branches ascend, and the fibrous roots descend, and is either solid, bulbous, or tuberous : solid, as in trees and other examples ; bulbous, as in tulips, &c. tuberous, as in potatoes, &c. The *radicula* is the fibrous part of the root, branching from the *caudex*. 2. The *trunk*, which includes the branches, is that part which rises in-

mediately from the *caudex*, is either herbaceous, shrubby; or arborescent, and admits of several other distinctions, according to its shape, substance, surface, &c. 3. The *leaves* are either *simple*, as those that adhere to the branch singly, or *compound*, as when several expand from one footstalk. Leaves are farther described by various terms indicative of their form and outline. 4. The *props*, those external parts which strengthen, support, or defend, the plants on which they are found, or serve to facilitate some necessary secretion: as, the *petiolus*, or footstalk of the leaf; the *pedunculus*, or footstalk of the flower; the *stipula*, or husk, that is, the small leaves that generally surround the stalk at its divisions; the *cirrhus*, or tendril; the *pubes*, or down; the *arma*, or defensive weapon, as thorns. 5. The *fructification*, or mode of fruit-bearing. 6. The *inflorescence*, or mode by which the flowers are joined to the several peduncles.

The various parts of a flower are arranged under distinct heads, consisting of the "Calyx," or Empalement: the "Blossom" or Corolla: "Stamens" or Chives: "Pistils" or Pointals: "Seed Vessel" or Pericarpium, and "Seeds" or Semina. To these are to be added the "Nectary" and "Receptacle." The calyx is formed of one or more green or yellowish green leaves placed at a small distance from, or close to the blossom. There are different kinds of calyxes, as the perianthium or cup near the flower, in the rose:—the involucre, remote from the flower, in umbelliferous plants, as is seen in the hemlock and carrot:—the catkin, or amentum, as in the willow or hazel:—the sheath or spatha, in the snow-drop:—the husk or gluma,

in wheat, oats, and different kinds of grasses :—the veil, or calyptra, covering the fructification of some of the mosses, and resembling an extinguisher :—the curtain or volva, surrounding the stems, and attached to the pileus or cap, that spreading part which forms the top of several fungi, and covers the fructification, and which in the common mushroom covers the gills.

The Blossom is that beautifully coloured part of a flower, which principally attracts the attention. It is composed of one or more petals, or blossom leaves. When it is united in one, as in the Polyanthus or Auricula, it is termed a blossom of one petal, but if it be composed of many parts, it is then said to be a blossom of one, two, three, or many petals.

The Stamens are slender thread-like substances, generally placed within the blossom, and surrounding the Pistils. It is composed of two parts, the Filament or Thread, and the Anther or Tip, but the latter is the essential.

A Pistil consists of three divisions, the Germen or Seed-bud, the Style or Shaft, and the Summit or Stigma; but the second is often wanting. Some flowers have only one Pistil: others have two, three, four, &c. or more than can easily be counted. The Seed-Vessel, in the newly opening flower, is called the Germen; but when it enlarges it is termed the Seed-Vessel. Some plants have no appendage of the kind, and then the seeds are uncovered, as in the dead nettle; the cup, however, generally incloses and retains the seeds till they ripen: and in the tribe of grasses, this friendly office is generally performed by what was previ-

ously called the blossom. Seeds are sufficiently well known to render a description unnecessary: the part to which they are affixed within the Seed-Vessel, is termed the Receptacle of the seeds.

Nectaries are those parts in a flower which are designed to prepare a sweet nectareous liquor. The tube of the blossom, as in the honey-suckle, frequently answers the purpose; but in many other flowers, there is a peculiar organization for the purpose. At the base of the petal, in the crown imperial, the Nectary is a very peculiar one, containing the liquor; from which, as there are few flowers in a greater or less degree unprovided with it, the little industrious bee derives its honey.

The Receptacle is the seat or base to which the various divisions of a flower are affixed. Thus, if you pull off the Calyx, the Blossoms, the Stamens, the Pistils, and the Seeds or Seed-Vessel, the substance remaining on the top of the stalk is the Receptacle. In many plants it is not particularly striking, but in others it is remarkably so; thus in the artichoke, after removing the Calyx, the Blossoms, and the bristly substances, the remaining part, so highly esteemed for the table, is the Receptacle.

The application of the different divisions of a flower, are simply elucidated in the following specimen of a crown imperial; but should it not be easy to procure one, a tulip or lily will answer the purpose nearly as well.

CROWN IMPERIAL.

(Figure 32. Pl. Botany.)

Calyx None.

Blossom . . . Six Petals, *a. a. a. a. a. a.*

**Stamens . . . Six, *bc. bc. bc. bc. bc. bc.* Filaments
six-shaped, like an awl, *b. b. b. b.*
b. b. Anthers oblong, four-cornered,
*c. c. c. c. c. c.***

Pistils Single.

**Germen oblong, three-cornered, *d.*
Style longer than the Stamens, *e.*
Summit with three divisions, *f.***

**Seed-Vessel . An oblong capsule with three cells
and three valves. Fig. 33. repre-
sents the Seed-vessel, cut across to
show the three cells in which the
seeds are contained.**

Seeds Numerous and flat.

The Classes are next to be considered, which were, according to the system of Linnæus, divided into twenty-four.

The characters are taken either from the number, length, connection, or situation of the Stamens.

The first class comprehends all that have a single stamen in each blossom, and this he calls *monandria* (one male) fig. 1; the second class such

as have two stamina, called *diandria* (two males) fig. 2; the third, fourth, and so on, up to the tenth, are named in the same way, *triandria* (three males) fig. 3; *tetrandria* (four males) fig. 4, to 10, &c. &c. There being no plants with eleven stamina, and the number not being uniformly twelve in many plants, though there or thereabouts, the eleventh class, called *dodecandria* (twelve males) fig. 11, includes all plants that have from eleven to nineteen inclusive. If the stamina are twenty or more, and are attached to the calyx or corolla, the plants belong to the twelfth class, *icosandria* (twenty males) fig. 12. If above nineteen, and attached to the base of the flower, and not to the calyx or corolla, they are of the class *polyandria* (many males) fig. 13, which is the thirteenth class. Plants with four stamina, two of which are shorter than the other two, are in the fourteenth class, *didynamia* (two powers) fig. 14. Plants with four long and two short stamina constitute the fifteenth class, the *tetradynamia* (four powers) fig. 15. In *monadelphia*, which is the name of the sixteenth class, the threads of the stamina are all united at bottom, but the antheræ are separate, fig. 16. In *diadelphia* the threads are united, not altogether, but in two bodies, fig. 17. In *polyadelphia* they are connected in three or more bodies, fig. 18. If the threads are separate, but the antheræ united, the plant is in the nineteenth class, *syngenesia*, fig. 19. In all the above classes the stamina are distinct, and separate from the pistillum; but where the former grow upon the latter, the plant is of the class *gynandria*, which is the twentieth, fig. 20. Sometimes the stamina are in one blossom, and the pistillum or pistilla in another

but on the same plant: in this case they form the class *monacia* (one house) fig. 29. But if the stamiferous blossom is on one plant, and the pistilliferous on another, it is of the twenty-second class, *diacia* (two houses) fig. 30. And lastly, if some blossoms have both stamina and pistilla, and others only one or the other, whether on the same plant, or on different plants, they come under the twenty-third class, *polygamia*, fig. 31. These include all vegetables whose flowers are conspicuous. But there are some, as mosses, sea-weeds, mushrooms, &c. whose flowers are inconspicuous, or whose parts of fructification are not stamina and pistilla. These are all arranged together in the twenty-fourth class, called *cryptogamia*: See fig. 20—7.

These 24 classes have been recently reduced to 20, which may be thus arranged with examples under each.

TABLE OF THE CLASSES.

class.	statement in each flower.	fig.	examples
1. Monandria....	one	1 (4.)...	Mares-tail, Parley-piert.
2. Diandria.....	two.....	2	Privet, Sage.
3. Triandria.....	three.....	3 (4. & c.)	Yellow Flag, the Grasses.
4. Tetrandria....	four, all of the same length.....	4	
5. Pentandria...	five, the anthers not united.....	5	
6. Hexandria...	six, all of the same length.....	6	
7. Heptandria...	seven.....	7	Horse Chestnut.
8. Octandria.....	eight.....	8	Mezerion, Heath, Willow-herb.
9. Enneandria...	nine.....	9	Bay Tree, Flowering Rush.
10. Decandria....	ten, the filaments not united.....	10	
11. Dodecandria..	12 to 19.....	11	
12. Ictandria....	more than 12, fixed to the calyx or petals..	12	
13. Polyandria...	20 to 1000, fixed to the receptacle.....	13	
14. Didynamia....	four, 2 long and 2 short.....	14	
15. Tetradynamia	six, 4 long and 2 short.....	15	
16. Monadelphia.	the filaments united.....	16	Pea, Furze, Broom.
17. Dialophia....	in 1 or 2 sets, blossoms butterfly shaped..	17	Orange, St. John's Wort.
18. Polyadelphia.	in 3 or more sets.....	18	Cocksfoot, Sunflower, Thistle.
19. Syngenesia...	5 stam. anthers united, flowers compound.	19	{ Fern, Moss, Liverwort, Sea- Woods, Mushrooms.
20. Cryptogamia.	flowers inconspicuous.	20-27	

A knowledge of the Orders may be very easily attained, by observing that,

In the class *Didynamia*, they depend upon the seeds having a seed vessel, or not.

Tetradynamia, upon the shape of the seed-vessel.

Syngenesia, upon the structure of the florets.

Cryptogamia, upon the natural assemblages of plants resembling each other.

And that in all the other classes, excepting *Monadelphia*, *Diadelphia*, and *Polyadelphia*, they depend upon the number of pistils only. In determining the number of pistils, count the styles, as they appear at their bottom part, or base; but if the summits are not supported upon styles, then count the summits.

Recapitulation of the Classes, with their attendant Orders and familiar examples.

Monandria.

Order *Monogynia* (1 pistil) Common Stonewort.

Digynia . . (2 pistils) Water Fennel.

Tetragynia (4 pistils) Pondweed.

Diandria.

Order *Monogynia* (1 pistil) Privet.

Digynia . . (2 pistils) Sweet-scented Vernal Grass.

Triandria.

Order *Monogynia* (1 pistil) Wild Vine.

Digynia . . (2 pistils) Meadow Foxtail.

Trigynia . . (3 pistils) Small-water Chickweed.

Enneagynia (9 pistils) Blackberried Heath.

Tetrandria.

Order *Monogynia* (1 pistil) Shepherd's Rod.

Digynia . . (2 pistils) Chickweed Toadgrass.

Trigynia . . (3 pistils) **Common Box.**

Tetragynia. (4 pistils) **Common Holly.**

Pentandria.

Order Monogynia (1 pistil) **Water Mouse-ear.**

Digynia . . (2 pistils) **Common Hop.**

Trigynia . . (3 pistils) **Dwarf Elder.**

Tetragynia (4 pistils) **Grass of Parnassus.**

Pentagynia (5 pistils) **Round-leaved Sundew.**

Polygynia . (many pistils) **Little Mouse-ear.**

Hexandria.

Order Monogynia (1 pistil) **Common Snow-drop.**

Trigynia . . (3 pistils) **Meadow-Saffron.**

Hexagynia . (6 pistils) **Saracen's Birthwort.**

Polygynia . (many pistils) **Water Plantain.**

Heptandria.

Order Monogynia (1 pistil) **Chickweed Winter-Green.**

Octandria.

Order Monogynia (1 pistil) **Rosebay Willow-Herb.**

Digynia . . . (2 pistils) **Common Hazel-Nut Tree.**

Trigynia . . . (3 pistils) **Snake Weed.**

Tetragynia . (4 pistils) **Water Wort.**

Enneandria.

Order Digynia . . (2 pistils) **Dog Mercury.**

Hexagynia . (6 pistils) **Flowering Rush.**

Decandria.

Order Monogynia . (1 pistil) **Wild Rosemary.**

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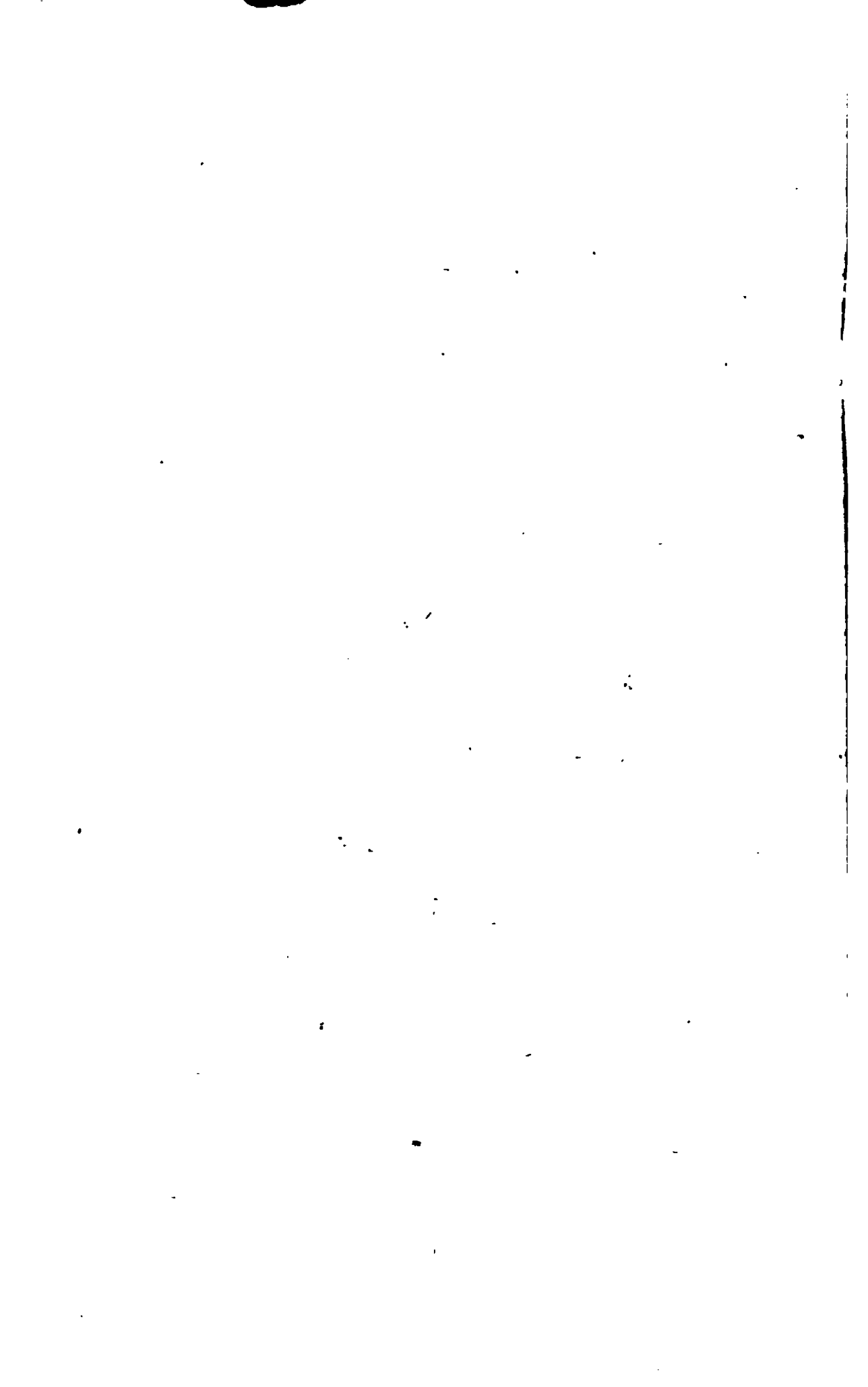
The first part of the report deals with the general situation in the country. It is a very interesting and informative study of the political and economic conditions of the country at the time. The author has done a great deal of research and has gathered a wealth of material. The report is well written and is a valuable contribution to the study of the country.

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Digynia . . (2 pistils) London Pride.

**Trigynia . . (3 pistils) Greater Stitch-
wert.**

Pentagynia . (5 pistils) Cuckoo Flower.

Dodecandria.

**Order Monogynia (1 pistil) Floating Horn-
weed.**

Digynia . . (2 pistils) Common Agrimony.

Trigynia . . (3 pistils) Chesnut Tree.

**Dodecagynia (12 pistils) Common House-
leek.**

Icosandria.

Order Monogynia (1 pistil) Black-thorn.

Digynia . . (2 pistils) Hawthorn.

Trigynia . . (3 pistils) Mountain Ash.

Pentagynia (5 pistils) Crab Tree.

**Polygynia : (many pistils) Common Mea-
dow Sweet.**

Although this is called the class of 20 Stamens, because the flowers arranged under it generally contain about that number; yet the classic character is not to be taken merely from the number of stamens, but from a consideration of the following circumstances, which will sufficiently distinguish it both from the preceding and following classes.

Calyx, consisting of one leaf, concave.

Petals, fixed by claws to the inside of calyx.

**Stamens, more than 19, standing upon the petals
or calyx, (but not upon the receptacle).**

Polyandria.

Order Monogynia (1 pistil) Common Celandine.

Digynia . . (2 pistils) Upland Burnet.

Trigynia . . (3 pistils) Wild Larkspur.

Pentagynia . . (5 pistils) Columbine.

Hexagynia . . (6 pistils) Water Aloes.

Polygynia . . (many pistils) Wood Anemone.

Most of this class are poisonous.

Didynamia.

Order **Gymnosperma** (seeds uncovered) Red Dead Nettle.

Order **Angiosperma** . . (seeds covered) Common Eyebright.

The plants in the first order of this class are odiferous and cephalic, none of them are poisonous.

Tetradynamia.

Order **Siliculosa** (Pouch, or broad Pod) Horseradish.

Order **Siliquosa** (long Pod) Wall-flower.

It is necessary to remark, that the flowers of this class have uniformly 4 petals; an attention to this circumstance will probably save the learner some trouble, as the difference in the length of the stamens is not always very obvious, and especially as the plants of the Hexandria class have none of them 4 petals.

Monadelphia.

Order **Triandria** . . (3 stamens) Juniper Tree.

Order **Decandria** (10 stamens) Wood Cranesbill.

Order **Polyandria** . . (many Stamens) Common Mallow.

In this class the filaments are all together at the bottom, but separate at the top. The orders in this and the two following are determined by the number of the stamens.

Diadelphia.

Order Hexandria (6 stamens) Common Fumitory.

Octandria . (8 stamens) Common Milkwort.

Decandria . (10 stamens) Common Vetch.

This class comprehends the butterfly-shaped flowers. From the name of this class, the young Botanist will be induced to imagine, that the filaments are always formed into two sets, but this is by no means the case, as in many instances they are united into one set. The butterfly shape of the blossom will therefore (as in the garden pea) be a more certain guide.

Polyadelphia.

Order Polyandria. Common St. John's Wort.

Syngenesia.

Order, Polygamia Æqualis. Florets furnished with stamens and pistils. Common Sowthistle.

Polygamia Superflua. Florets in the centre, furnished with stamens and pistils, those in the circumference with only pistils. Groundsel.

Polygamia Frustanea. Florets in the centre, furnished with stamens and pistils, those in the circumference without any. Corn-flower.

Polygamia Necessaria. Florets in the centre, furnished with stamens and pistils, but producing no seed. Those in the circumference with only pistils, and producing seed. Marigold.

Polygamia Segregata. (Separated florets) That is when several florets, each having its own proper cup, are inclosed within one common calyx, so as to form altogether one flower only.

The **Syngenesia** class comprehend those flowers which Botanists have agreed to call compound. The essential character of a compound flower, consists in the anthers being united, so as to form a cylinder, and a single seed, being placed upon the receptacle, under each floret. The Dandelion, the Thistle, and the Sun-flower, are compound flowers, that is, each of these flowers are composed or compounded of a number of small flowers, called florets.

The **Cryptogamia** class, consists of those plants in which the obscure and peculiar fructifications do not fall under either of the preceding distributions ; they are divided into five orders.

1. **Miscellanæ**—Miscellaneous. Including subjects incapable of arrangement under any of the following, and in many respects disagreeing with one another, as the horsetail, &c.

2. **Filices**—Ferns. A well known kind of production, comprising plants which have their flowers disposed in spots or lines, on the under surface of the leaves, as in the Polypody and Spleenwort, though sometimes in spikes, as in the Osmund Royal.

3. **Musci**—Mosses. Familiar subjects.

4. **Hepaticæ**, a kind of mosses. Distinguished from the foregoing, by a difference in the fructification.

5. **Algae**, including plants which scarcely admit

of a division into root, stem, and leaf; to these belong the different kinds of Lichens, and Fucus or Sea-weed.

6. Fungi—Fungusses. Common objects comprising mushrooms, &c.

“ Thus have we given a sketch of the Linnæan division of the vegetable kingdom into twenty-four classes, and of each class into two or more orders.

“ The next division is into *genera* or families, each genus uniting together all those plants which bear so strong an affinity as to be considered members of the same family. The name given to the genus is the name by which all the plants of that family are known: thus, the genus *rosa* includes all the different kinds of roses; *salix*, which is the scientific name for willow, every kind of willow; *convolvulus*, every kind of bindweed; and *erica*, all the heaths. The distinctive or characteristic marks upon which the genera are founded, are always taken from the shape, position, number, or some other property of the different parts of the flower, as the calyx, petals, seeds, seed-vessels, &c.; whether they be round, or heart-shaped; whole, or divided; rough, or smooth; single, or many; and the like.

“ There is only one more division necessary to bring us down to particular plants. For instance, I have found, that my newly gathered flower is a rose, a convolvulus, or a heath, but I want to know what kind of rose, convolvulus, &c. For this purpose each genus is divided into *species*, the characteristic marks of which are formed upon the leaves, stems, roots, or any other parts of the plant, except the flower; and some name, called the specific or

trivial name, is given to each species, thus characterized, which, added to the name of the genus, sufficiently distinguishes each particular plant: thus, there is the *salix lanata*, *salix latifolia*, *salix repens*, or the woolly willow, the broad-leaved willow, the creeping willow, and several others, which are all species of the genus *salix*, or willow, in the same way that the long-eared bat, the common bat, the vampyre bat, and the horse-shoe bat, are all species of the same genus *vespertilio*, or bat.

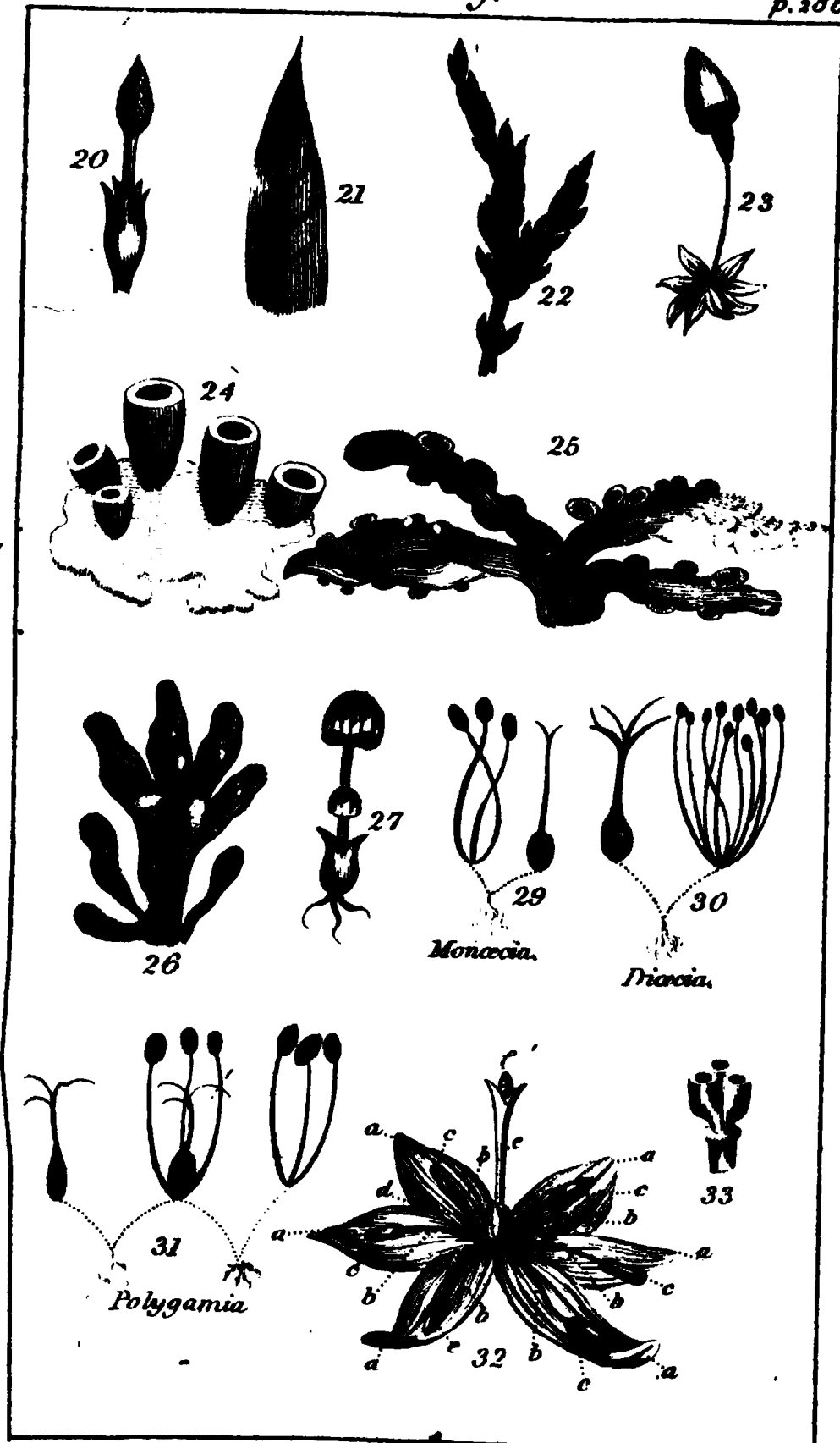
“ We have now gone through all the divisions and subdivisions of Linnæus’s system of classification for the vegetable kingdom; and have arrived at the ultimate object of our research, in ascertaining the family and species to which any individual plant may belong. I shall now elucidate the whole by an example.

“ Suppose that you have found, and brought home from your walk, a delicate, blue, bell-shaped flower, called by some bell-flower, by others Canterbury-bell, and by others again blue-bell. You naturally wish to know by what name this plant is distinguished by the botanist, what name all scientific men in every country have agreed to give it, that you may be at no loss under what name to look for a description of it, or how to communicate to others any observations you may have made upon this plant yourself.

“ In the first place, then, examine how many stamina, or how many of those small bodies called antheræ, are to be found in the bell-shaped corolla, or blossom; you discover five; now run over the classes of Linnæus, till you come to that which is distinguished by its five stamina; this

...many
...called
...shaped
...low ran
...to that
...this is

[illegible]



called *pentandria*, and you therefore know your flower to be in this class. Next look for the pistillum or pistilla, of which in this plant you will find only one; this characterizes the first order, called *monogynia*, and therefore your plant is in the class *pentandria*, and order *monogynia*. You have now done with the stamina and pistilla, and must attend to the other parts of the flower, comparing them, as you go on, with the characters of all the genera in this first order of the fifth class. The calyx you find to have five divisions, sharp, and not quite upright; the corolla of one petal, bell-shaped with five clefts, close at the base; shrivelling; segments broad, sharp, open; seed-vessel roundish, of three or four cells; all which tallies exactly with the generic character of *campanula*; this therefore is the genus, and you have now only to find out to what species yours belongs. The leaves nearest to the roots, and which are generally so close to the ground as to require care not to leave them behind in gathering the plant, you will find to be round, or rather heart-shaped, or sometimes kidney-shaped, whilst the leaves on the stem are narrow, and strap-shaped; this determines the species, and in this your flower agrees with the character of that called *rotundifolia*. You have therefore now determined your plant to be the *campanula rotundifolia*, and you may read all the descriptions of this plant without a doubt as to its being the same, and may describe to others, where you found it, when you found it, and what else you know of it, without any fear of confounding it with any other blue, bell-shaped flower, of which there are many, both of this and of other genera." See Skrimshire's Essays.

BOTANY-BOY. See *New Holland*.

BORE, in old law books, signifies recompence, amends, &c. thus *manbore* is compensation for a person slain.

BOTTLE, a small vessel proper to contain liquors, made of leather, glass, or stone. Dr. Percival cautions against the practice of cleaning wine-bottles with leaden shot. He thinks that, through negligence, some must sometimes be left behind; and that, dissolving in wine or beer, they communicate the poisonous sweetness sometimes perceived in port-wine, when such adulteration is neither designed nor suspected. Potash is recommended in their stead; a small quantity of which, with the water, will clean two gross. Bottles were formerly made of the skins of goats and other animals, which were apt to decay by use and length of time, hence the propriety of putting "new wine," that was apt to ferment, "into new bottles" which were strong and able to endure the force of the expansion; but "old wine" in which there was no danger of fermentation, might safely be put "into old bottles", that were less strong: or which from long use might have become brittle.

BOTTOMRY, in commerce, is in the nature of a mortgage of a ship: when the owner takes up money to enable him to carry on his voyage, and pledges the keel or bottom of the ship (*pars pro toto*) as a security for the repayment.

BOUNTY, money given by government on the exportation or importation of certain articles of commerce, the trade in which it is thought necessary to encourage by temptations beyond its ordinary profits. The effect of bounty on the production of

any article, is to render it dearer in the home market.

Bow, a weapon of offence made of wood, with a string fastened at each extremity, and which, being bent, expels an arrow, on its rebound, with great force and velocity. The bow is the most ancient and most universal of all weapons; and one, in the construction and use of which those nations, that have no other, excel in a degree that appears wonderful to men not practised in its use.

BOWLS, a game played upon a fine smooth grassy surface, used solely for the purpose, and denominated a bowling-green. The party may consist of two, four, six, or eight. The sides being selected by the throwing up of a coin, each player has two bowls, which are marked, so that all may know their own. The leader sends off a smaller bowl called a jack, which he follows with his first bowl, getting as near the jack as possible: he is then followed by one of the adverse party, and so on till all the bowls are played; as many of the bowls, on either side, as are nearer to the jack than the nearest on the opposite side, so many do the successful party score towards the game. Sometimes a ball laying very near the jack, is removed to a distance by the hit of an adversary's bowl, which remains nearer the jack than the bowl it has driven away: this is called a *rub*, hence the proverb, "he that plays at bowls, must expect rubs."

BRACHMAN or **BRACHMIN**, an ancient religious denomination of men in India; the successors of whom, it is said, are called *Bramins*. See **BRAMINS**.

BRAIN, a soft whitish mass, enclosed in the cranium or skull, encompassed with two membranes

called *dura mater* and *pia mater*, and divided into three principal parts: the *cerebrum*, or brain, strictly so called; the *cerebellum*; and the *medulla oblonga*. The *cerebrum* is supposed by most authors to consist of innumerable minute glands, destined for the secretion of animal spirits from the blood, and of infinitely fine fibres, communicating with the nerves. The *cerebellum*, or hinder part of the brain, is esteemed a kind of little brain itself. Its substance is harder and more solid than that of the *cerebrum*, but of the same nature. The *medulla oblonga* or the medullary part, and the *cerebellum* are joined in one, of which the spinal marrow is a continuation, whence originate most of the nerves of the trunk of the body.

BRAMINS, the cast or hereditary division of Hindoos peculiarly devoted to religion and religious science, in the same manner as, among the Jews, the priesthood was ordained to continue in the tribe of Levi. The families of this cast claim peculiar veneration from the rest, and seem, in their name of *bramins*, to claim the merit of being the more immediate followers of Brahma, their incarnate deity. On the other hand, to maintain this character, they profess a peculiar circumspection over their conduct, and self-denial on many points wherein they allow indulgence to their less holy neighbours. To speak of the religion of the *bramins*, it is more correct to say the religion of Brahma, of whom the *bramins* make part of the disciples. Of this system it is impossible to enter into particulars within a narrow space; and, perhaps, Europeans ought to confess themselves altogether incompetent to the task. In its morals, it often presents very amiable features;

in its metaphysics, or at least in its attempts to describe the actions of the Creator toward mankind, its symbols are frequently absurd. How far these are the degeneracies of an ancient establishment, and the misconstructions of ignorance, it is by no means easy to say. It were too hasty a conclusion, however, to infer, that, in its institution, if not in its pure state at present, it was not founded on the basis of a praise-worthy morality and tolerably sound philosophy. Of the institutions of Brahma, that of the subdivisions of his disciples into perpetual casts is the most striking, and most deserving of attention.

BRAN, the skins or husks of corn, especially of wheat, separated from the flour by a sieve. From this, starch is principally made; it is much used by dyers, and in other manufactures.

BRANCH, signifies the arm of a tree, which proceeding from the trunk, helps to form the head or crown thereof. The same term is applied in genealogy and anatomy; thus we say the branch of a family, the branch of an artery, vein, &c.

BRANCHIE, gills, in the anatomy of fishes, the parts corresponding to the lungs of land animals, by which fishes take in and throw out a certain quantity of water impregnated with air: hence we have the term,

BRANCHIOSTEGOUS, which denotes an order of fishes having gills without bony rays. Of these Linnæus made ten genera, which later naturalists have placed among the CARTELAGINEI, which see.

BRANDY, a spirituous and inflammable liquor, extracted from wine and other liquors of distillation. The wine-brandy, made in France, is esteemed the

best in Europe. It is made wherever wine is made, and pricked wine is used for this purpose, rather than good wine. The chief brandies, for foreign trade, and those accounted best, are the brandies of Bourdeaux, Rochelle, Cogniac, Blasois, Poictou, Touraine, Anjou, Nantz, Burgundy, and Champagne.

BRASIL, a large country on the east side of South America, said to be in some places 15 or 16 miles broad, and a thousand miles long. It was discovered and settled by the Portuguese, and in the year 1807, the government and court of Portugal emigrated thither to free themselves from the power and tyranny of Bonaparte. The air of Brasil, though within the torrid zone, is rather temperate and wholesome. The water is good, and the soil rich and fertile. Its exports are sugar, rum, tobacco, hides, drugs, gold and diamonds: for which it receives, woollen stuffs, silk, hats, hardwares, wine, &c.

BRASIL-WOOD, an American wood of a red colour, and very heavy, used in dying. It grows naturally in the warmest parts of America. The demand has been so great that none of the trees are left in any of the British plantations; so that Mr. Catesby owns himself ignorant of the dimensions to which they grow. The largest remaining are not above two inches in thickness, and eight or nine in height. The colour produced from this wood is greatly improved by a solution of tin in *aqua regia*.

BRASS, is a most useful compound, formed by the union of copper with zinc in various proportions. This substance, as is well known, is of a beautiful yellow colour, but varying in its shades

according to the proportion of ingredients employ-
ed. It is more fusible than copper, and not so apt
to tarnish : it is malleable when cold, but not when
heated. The theory of Brass-making is this : mix
together the oxydes of copper and zinc, and reduce
them with a carbonaceous flux. The following are
the proper proportions ; 50 grains of oxyde of cop-
per ; 100 grains of lapis calaminaris ; 400 grains of
black flux and 30 grains of charcoal powder. Melt
the mixture in a crucible till the blue flame is seen
no longer on the lid of the crucible, and when cold
a fine bottom of brass is found beneath the scoria,
weighing rather more than the copper alone ob-
tainable from its oxyde without the calamine.
Brass is so ductile that sieves of extreme fineness
are wove with the wire, after the manner of cam-
bric weaving.

BRASSING, the soldering or joining
iron together by means of this ;
melted between the pieces that are
the work be very fine, as when a
broken saw are to be braked together
with pulverized borax, melted will
may incorporate with the brass pro-
vided to it. The piece is then ex-
posed without touching the coals, and heated till the
brass is seen to run.

BRAN, in a general sense,
particular sense, it is a dry &
constituted the greater part
servable, that without bread,
spirit, no nation seems to be
sunders, who have but little
bread of distaff, and of

pine, which seems to be used not so much for their nourishment as for supplying a dry food. For this, mankind seem to have a universal appetite, rejecting bland, slippery, and mucilaginous foods. This, says Dr. Cullen, is not commonly accounted for, but seems to arise from very simple principles. The preparation of our food depends on the mixture of animal fluids in every stage. Among others, the saliva is necessary, which requires dry food as a necessary stimulus to draw it forth; as bland, slippery, fluid aliments are too inert, and make too short stay in the mouth, to produce this effect, or to cause a sufficient degree of mastication to emulge that liquor. For this reason, we commonly use dry bread along with animal food, which would otherwise be too quickly swallowed. For blending the oil and water of our food, nothing is so fit as bread, assisted by a previous mastication; for which purpose, bread is of like necessity in the stomach, it being expedient that a substance of solid consistence should be long retained there.— Bread, well raised and baked, differs from unfermented bread, not only in being less compact, lighter, and of a more agreeable taste, but also in being more easily miscible with water, with which it does not form a viscous mass, a circumstance of great importance in digestion. With regard to the vegetables from which bread may be prepared, it is to be observed, that the grains of all are almost entirely composed of substances very proper for the nourishment of animals; but that those which contain a farinaceous matter are both the most agreeable and most nutritive. The following is reckoned an excellent recipe for making bread: to half a

bushel of flour add six ounces of salt, a pint of yeast, and six quarts of boiled water: in warm weather pour in the water nearly cold, but in winter and when the weather is cold, the water should be warm. These are to be put in a kneading-trough, and well worked into dough. This is to be covered up to ferment and rise, and in this state it is called sponge. Let it lie about an hour and half, then knead it again, and re-cover it for some time longer; heat the oven, and when properly cleaned, make the bread into loaves, and place them in it to bake.

BREAD (Adulteration of,) by means of alum, may be considered as one lamentable source of the diseases of children, as obstructions in the bowels, rickets, &c. To discover such unlawful practices, requires no chemical skill: on macerating a small piece of the crumb of new-baked bread in cold water, sufficient to dissolve it, the taste of the latter, if alum has been used by the baker, will acquire a sweetish astringency. Another method of detecting this adulteration consists in thrusting a heated knife into a loaf before it has grown cold; and if it be free from that ingredient, scarce any alteration will be visible on the blade; but, in the contrary case, its surface, after being allowed to cool, will appear slightly covered with an aluminous incrustation.

BREAD-FRUIT, the fruit of the *artocarpus*, which appears to have been first discovered to Europeans by the great navigator Dampier. It is indigenous in the islands of the South Sea; the tree is said to be of the size of a large apple tree; the leaves broad, and of a dark green. The fruit is appended to the

boughs in the manner of apples, and of about the size of a pound of bread, inclosed with a tough rind, which, when ripe, turns of a yellow colour. The internal part is yellow, soft, and sweet. The natives of the countries where it grows, bake it in an oven till the rind is black; and this being scraped off, eat the inside, which is then white, resembling new-baked bread, having neither seed nor stone. If kept in this state twenty-four hours, it grows harsh. It is said to be very satisfying to the stomach, full of nourishment, and therefore proper for hard-working people. It is known at Bantam by the name of *foccum*; and Anson calls the tree, the *rima*. It supplies food during three fourths of the year.

BREVIARY, a book of divine service in the Romish church. It is composed of matins, lauds, third, sixth, and ninth vespers, and the *complini* or *post communio*.

BREWING, the operation of preparing ale or beer from malt. A quantity of water being boiled, is left to cool till the height of the steam be over; when so much is poured to a quantity of malt in the mashing-tub as makes it of a consistence to be just well rowed up. After standing thus a quarter of an hour, a second quantity of water is added; and that in proportion as the liquor is intended to be strong or weak. This part of the operation is called mashing. The whole now stands two or three hours, more or less according to the strength of the wort, or the difference of the weather, and is drawn off into a receiver, and the mashing repeated for a second wort, in the same manner as for the first, only the water must be cooler than before, and

must not stand above half the time. The two worts are then to be mixed, the intended quantity of hops added, and the liquor, closely covered up, quickly boiled for the space of an hour or two; then let into the receiver, and the hops strained from it into the coolers. When cool, the barm or yeast is applied; and it is left to work or ferment till it be fit to tun up. For small-beer, there is a third mashing with the water nearly cold, not left to stand above three quarters of an hour, and hopped and boiled at discretion. For double beer or ale, the liquors resulting from the two first mashings must be used, as liquor for the third mashing of fresh malt. The following is a good receipt for brewing beer on a small scale. We can from our own experience testify to its value. The quantity of malt is one peck only. In a copper, &c. that will hold ten or twelve gallons, boil your water, and when so far cooled down that you can see your face in it, put some of the water into a mashing tub, and add the malt by degrees in order that it may be well mixed with a ladle, then add more malt and water, till the malt and about two or three gallons of water are used, let it stand closely covered up with a woollen cover of two or three doubles, about an hour, draw it off and pour on more boiling water. Let it stand half an hour, and repeat the process till you have the quantity of wort you wish to make. A peck of malt will make five gallons of decent table ale. After the wort has run off from the mash tub let it quickly with about three ounces of hops. The pour the liquor through a sieve into vessels to cool and when about as warm as new milk fresh draw from the cow, add about half a pint of yeast to it

which must be mixed thoroughly with the wort. When the fermentation is over, put it into a barrel ; and after a day or two let it be closely bunged down : it will be fit for use in a month.

BRIBERY, the act of prevailing upon any individual to do a legal or illegal act for the sake of reward. In elections, we have heard of voters bribed to a party ; in law, of witnesses bribed to bear false testimony, of jurors bribed to return unjust verdicts, of judges bribed to forego their duty, or to do it. In many of the lower official departments, the practice of bribery is so notations and systematic, that those who have any intercourse with them submit to the fraud as a matter of necessity, and the receivers are not deficient in effrontery ; but the offence of taking bribes, if prosecuted at law, is punishable by fine and imprisonment.

BRICK, a composition of earth, formed into long squares, four inches broad and eight or nine long, and baked or burnt in a kiln, or in a *clamp*, to serve as stones in building. Bricks are generally made of a yellowish-coloured, fattish earth, commonly called *loam*, ground into a paste, and mixed with ashes. Common bricks are of a brownish colour ; stock bricks are made to resemble stone as nearly as possible. The red bricks, formerly so much admired, must be made of earths that contain ferruginous particles, and baked in kilns. Bricks may be made of any earth that is clear of stones.

BRIDEWELL, a name first given to a building near Blackfriars bridge, in London, where there was a well, " dedicated to one of the St. Brides or Bridgets. Bridewell is not only a prison for the dissolute, but an hospital for the education of indus-

trious youth. Here, twenty arts-masters (as they are styled), consisting of decayed tradesmen, such as shoemakers, taylor, flax-dressers and weavers, have houses, and receive apprentices, who are instructed in the several trades; the master receiving the profits of their labours. After the boys have served their time with credit, they are paid ten pounds to begin the world with, and are entitled to the freedom of the city. They are dressed in blue, with a white hat."

BRIDGE, a work of carpentry, or masonry, built over a river, canal, &c. for the convenience of passing from one side to the other, and may be considered as a road over water, supported by one or more arches, and these are supported by piers or buttments. The longest bridge in England is that over the Trent at Burton, being 1545 feet in length, and consisting of 84 arches. This was built in the 12th century. The triangular bridge at Gropland, in Lincolnshire, which was erected in the 9th century, is said to be the most ancient gothic structure remaining in the kingdom. London-bridge is 900 feet long, 60 high, and 74 wide: it is supported by 18 piers from 34 to 26 feet thick. Westminster-bridge is 1280 feet long and 44 feet wide. It consists of 15 arches, was finished in 1760, and cost 229,000*l*. Blackfriars-bridge was finished in 1770: it consists of nine large arches, nearly elliptical, the breadth of the bridge is 42 feet, and the length, from wharf to wharf, 695 feet. It cost 150,849*l*.

BRIEF, in law, an abridgement of the client's case, made out for the instruction of counsel on a trial at law; wherein the case of the plaintiff, &c. is to be

briefly, but completely stated. The term *brief* is also used for a letter from the king, empowering distressed persons to ask for charitable contributions in all churches and chapels, and "from house to house."

BRIG, or *Brigantine*, a term variously applied by the mariners of different European nations, to a peculiar sort of vessel of their own marine. Among British seamen, this vessel is distinguished by having her mainsails set nearly in the plane of her keel, whereas the mainsails of other ships are hung athwart, or at right angles into the ship's length, and fastened to a yard which hangs parallel to the deck.

BRIGADE, a party or division of soldiers, either horse or foot. An army is divided into brigades of horse and brigades of foot: a brigade of horse is a body of eight or ten squadrons; a brigade of foot consists of four, five, or six battalions.

Brigade-major, an assistant officer to a brigadier.

BRIGADIER, the general officer who has the command of a brigade; the rank does not at present exist in the British service.

BRIMSTONE. See *SULPHUR*.

BRINE, is either native, as seawater, or the water flowing from salt springs; or artificial, being formed by the dissolution of salt in water. At the salt-works at Upwich, in Worcestershire, there are found at the same time, and in the same pit, three sorts of brine, each of a different strength. Curing or pickling fish in natural brine, is prohibited by act of parliament. Some steep their seed wheat in brine, to prevent the smut. Brine is also commended as a remedy against gangrenes.

BALNEO-WATERS. See MINERAL-waters.

BAISTLE, a rigid glossy hair found on swine, much used by brushmakers, shoemakers, saddlers and others. Bristles made use of in this country, are chiefly imported from Russia and some parts of the north of Germany.

BRITAIN, the present name of our island, says Macpherson, has its origin in the Celtic tongue; *Brit*, or *Braid*, signifying "extensive," and in "land." This island, which lies between 50° and 58°. 30' north lat. containing, in a line from north to south, nearly 550 miles, was once divided into many sovereignties. From the time of Egbert, A. D. 819, they were reduced to three: England, Wales, and Scotland. Edward III. united Wales to England, by conquest. James VI. of Scotland, by succession to the throne of England, united the crowns of the two kingdoms in one person, and thus governing the two Britains, or *Britannia-Prima* and *Britannia-Secunda* of the Romans, he styled himself king of Great Britain. This union was completed by Ann. Henry VIII. erected Ireland into a kingdom, and annexed the crown to that of England. Great Britain and Ireland were united in one kingdom on the 1st day of January, A. D. 1801, and the 41st of George III.

BURRIN, New, a country of North America, comprehending all the tract north of Canada, commonly called the Esquimaux country, including Labrador, New North, and New South Wales. The principal settlements belong to the English Hudson's Bay Company. There is also an island to the north of New Guinea named New Britain.

BROADCAST, a term in husbandry, signifying the

method of sowing field-plants by scattering the seed, and so called in contradistinction to the drill husbandry.

BROADSIDE, a discharge of all the guns on one side of a ship at the same time.

BROCADE or *Brocado*, a stuff of gold, silver, or silk raised and enriched with flowers, foliages, and other ornaments, according to the fancy of the merchants or manufacturers.

BROKER, a profession, of which there are two principal kinds; exchange-brokers and pawn-brokers. Exchange-brokers, are a sort of negotiators, who contrive, make and conclude bargains between merchants and tradesmen, in matters of money or merchandise; or stock-brokers, who are employed to buy and sell shares in the joint stock of a company or corporation, or in the public funds; or appraisers of household furniture. These, in London, are severally authorized to practise by one general licence granted by the lord-mayor, who administers an oath and takes bond for the faithful execution of the office. Pawn-brokers are persons who lend money to necessitous persons upon goods pledged as security for the same, at a legal interest, and under regulations established by act of parliament. See **EXCHANGE**: **STOCKS**, &c.

BRONZE, a mixture of copper and tin, and sometimes zinc, used for bells, cannon, statues, &c. This metal is brittle, hard and sonorous. The relative quantities of the component metals are varied according to the use to which the bronze is to be applied. Tin being less subject to rust than copper, renders bronze capable of being exposed to the air without becoming covered with verdigrise.

which is one reason why it is used for such works as cannon and statues. The greater susceptibility of bronze than copper is also an advantageous property, and much facilitates the casting of large works. It appears that tin, on its mixture with copper, changes the size and disposition of its pores, and gives to the compound a compactness through which it becomes specifically heavier than either of the metals in a separate state, and more secure from the corrosion of the atmosphere.

BRUISES, nothing more common than these among children. The injured parts are to have been soaked with vinegar, cold-water, brandy, lime-water, &c. applied to them frequently. If the bruise is slight nothing is better than the application of a small quantity of POMADE Divine, which see. This is also excellent for burns, the sting of gnats, wasps, &c. When bruises are pretty considerable, rest and a dose of Epsom salts are very conducive to a cure. If very violent the injured parts should be bled with leeches. Afterwards opodeldock, and liniments containing camphor may be used.

BRUSH, a well known instrument, adapted, according to its structure, to a thousand different purposes. Brushes are chiefly made of bristles. Mr. Thomason, of Birmingham, has obtained a patent for hearth brushes, so formed as to conceal the hair in a metal or wooden case by means of rack work.

BRUTA, the second order of animals in the class Mammalia, according to the Linnæan system. The animals of this order are characterised as having no fore teeth in either jaw; feet with strong hoof-

like snails; slow motions, and as feeding chiefly on vegetables. There are nine genera: as the Sloth, Elephant, &c.

BUBBLES, are small drops of fluids filled with air. The little bubbles, rising up from fluids, or hanging on their surface form the white scum at top, and these same bubbles form the steam or vapour flowing off from liquors in their boiling state.

BUBBLES, in commerce, a term given to projects for raising money on imaginary, or false pretences. The most remarkable one in this country was that of the year 1790.

BUCANER, one who dries and smokes flesh or fish after the manner of the Indians. The name was particularly given to the first French settlers on the island of St. Domingo, whose sole employment consisted in hunting bulls or wild boars, in order to sell their hides and flesh. The name was also applied to those famous piratical adventurers, chiefly English and French, who, in the seventeenth century, joined together to make depredations on the Spaniards in America.

BUCKLER, a piece of defensive armour used by the ancients, commonly composed of hides, fortified with plates of metal.

BUCKLERS, votive, were those consecrated to the Gods, and hung up in their temples, in commemoration of some hero, or as a thanksgiving for a victory obtained over an enemy, whose bucklers, taken in war, were offered as a trophy.

BUCKRAM, a sort of coarse cloth made of hemp, gummed, calendered and dyed of several colours. Used in drapery, garments, &c. required to be kept stiff to their form.

Bucolic, in ancient poetry, a poem relating to shepherds and rural affairs. The most celebrated of the ancient bucolics are those of Virgil.

Budding, a method of propagating fruit trees. The stocks are raised from seed; and in these, buds of other trees are inserted, which invariably produce the same kind of tree, fruit and flower, as those from which the buds are taken.

Burr, in commerce, a sort of leather prepared from the skin of the buffalo; which, when dressed with oil after the manner of chamois, makes what we call buff-skin. This is a very considerable article in the French, English and Dutch commerce at Constantinople, Smyrna, and along the coast of Africa. The skins of elks, oxen, and other like animals, when prepared after the same manner as that of the buffalo, are likewise called burrs.

Boo, a very troublesome insect in London and other crowded places. The destruction of bugs may be effected by a solution of corrosive sublimate in water, or in water and alcohol. This solution should be applied with a brush to every crevice where it is possible the insects can lodge.

Bolus, a disease in which the patient is affected with an insatiable and perpetual appetite for food; and, unless he is indulged, he falls into fainting fits. We have a well authenticated account of a person afflicted with this disease who devoured 879 lbs. of meat and drink in six days; nevertheless he lost flesh rapidly.

Bulk-heads, are partitions made athwart a ship, by which one part is divided from another; as the great cabin, gun-room, bread-room, &c.

Bull, among ecclesiastics, a written letter, or

public instrument, issued by order of the Pope from the Roman chancery, and sealed with lead; which seal is, properly speaking, the *bull* itself. It is impressed on one side with the heads of St. Peter and St. Paul, and on the other with the name of the pope, and the year of his pontificate.

BULL, *Golden* so called because the seal or *bull* is of gold, an edict or imperial constitution, made by the emperor Charles IV. reported to be the *Magna Charta*, or fundamental law, of the German empire.

BULLION, gold or silver, uncoined, and in the mass. When these metals are in their purity, they are so soft and flexible that they cannot well be brought into any fashion for use, without being first reduced and hardened with an alloy of some baser metal. To prevent the abuses that might be committed in making such alloys, European legislatures have generally established the quantity of alloy to be used, and thus fixed a standard-fineness within their several jurisdictions. According to the law of England, wrought plate in general is to be made to the legal standard; and the price of our standard gold and silver is the common rule whereby to set a value on bullion, whether the same be ingots, bars, dust, or foreign specie: whence it is easy to conceive that the value of bullion cannot be exactly known without being first assayed, that the exact quantity of fine metal therein contained may be determined. Silver and gold, whether in coin or bullion, though used as a common measure for other things, are no less commodities than sugars, hemp, or cloth.

Burr, of a sail, the middle part of it, formed

designedly into a bag or cavity that the sail may gather and hold the wind. It is used mostly in topsails. Bunt-lines are the small ropes made fast to the bottom of the sails.

Buoy, in sea affairs, a sort of close cask, or block of wood, fastened by a rope to the anchor, and which, floating on the surface of the water, points out its situation.

BURDEN, or Burthen, generally implies a load or weight supposed to be as much as a man, horse, &c. can carry. One horse will draw as much as six or seven men, or about 300 or 350 lb. Burden of a ship, is its contents, or the number of tons it will carry.

BURGAGE, or *Tenure in Burgage*, is where the king, or other person, is lord of an ancient borough, in which the tenements are held by a rent certain. It is indeed only a kind of town soccage; as common soccage, by which other lands are holden, is usually of a rural nature. (See SOCCAGE.) A borough is distinguished from other towns by the right of sending members to parliament; and where the right of election is by burgage-tenure, that alone is a proof of the antiquity of the borough. Tenure in burgage, therefore, or burgage-tenure, is where houses or lands which were formerly the scite of houses in an ancient borough, are held of some lord in common soccage, by a certain established rent. And these seem to have withstood the shock of the Norman encroachments principally on account of their insignificance, which made it not worth while to compel them to an alteration of tenure, as 100 of them put together would scarce have amounted to a knight's fee. Besides, the

owners of them, being chiefly artificers, and persons engaged in trade, could not with any tolerable propriety be put on such a military establishment as the tenure in chivalry was. The free soccage, therefore, in which these tenements are held, seems to be plainly a remnant of Saxon liberty; which may also account for the great variety of customs affecting many of these tenements so held in ancient burgage; the principal and most remarkable of which is that called Borough English.

BURGESS, an inhabitant of a borough, or one who possesses a tenement therein. In some countries burgesses and citizens are confounded, but not so here. Burgess is now commonly used for the representative of a borough-town in parliament.

BURGH-BOTE, signifies a contribution towards building or repairing castles or walls, for the defence of a borough or city.

BURGLARY, the offence of breaking by night into a mansion house, with intent to commit a felony. In this definition, there are four things to be considered: the *time*, the *place*, the *manner*, and the *intent*. 1. The time must be *night*; and herein the spirit of the distinction is, that it be that time called the *dead of the night*, in which mankind in general are in a defenceless state. 2. The *place* must be a mansion-house, that is a dwelling house, or some building adjoining a dwelling house, because the idea of inviolable security is exclusively attached to the place in which a man resides, and because it is only there that peculiar alarm or danger can attend a midnight attack; a barn or other distant building being, in general, as

much without the protection of the owner by day as by night. 3. The *manner* must be both a breaking and an entry. It must be a breaking, because if a person leave his doors or windows open, it is his own folly and negligence; but to come down a chimney is held a burglarious entry, since that aperture is as much closed as the nature of things will permit. To gain an entry by artifice is also burglarious. 4. The *intent* to commit a felony must be shown; otherwise, all the rest is only a trespass. Burglary is a felony at common law, but within benefit of clergy.

BURGO-MASTER, the chief magistrate of the great towns in Flanders, Holland and Germany. The authority of a Burgomaster resembles that of the Lord Mayor in London.

BURN, an injury received in any part of the body either by fire itself or by instruments made hot by fire, &c. When a scald or burn is general, or a large part of the body is burnt, the person should be kept immersed in cold water, renewed frequently and as cold as possible; when burns are local, and confined to particular parts of the body, powdered ice, or snow, or rags soaked in cold water should be applied. The following lotion is extremely useful, and should be kept in every house.

Take of camphorated spirit two drams, Goulard's extract one dram, and a pint of water. The mixture to be made in the order in which they are set down, otherwise the camphor will separate. The application to be renewed till the pain and inflammation subside: the wound may then be dressed with white cerate. See **BRUISE**.

BURNING, of females, by their cloaths being

caught fire: The following directions are circulated by the Royal Humane Society. If no person is present to assist her, she may relieve herself by throwing her clothes over her head, and laying down and rolling upon them. She must by no means run away, and flane always tending upwards, much of the mischief will be prevented if a person in that unfortunate situation will throw herself on the ground, and if possible roll about her a carpet, hearth rug, &c. If another person be present, then, without any regard to delicacy, such person should instantly pass the hand under all the clothes to the lowest garment, and raise the whole together, and close them over the head, by which in an instant almost, the flame will be indubitably extinguished. This is the most expeditious and effectual method of preventing the dire effects of a terrible accident which is perpetually occurring.

BURNING-GLASS, a convex glass, commonly spherical, which being exposed directly to the sun, collects all the rays falling thereon into a very small space, called the focus; where wood, or any other combustible matter, being put, will be set on fire. The term burning-glass is also used to denote certain concave mirrors, whether composed of glass quick-silvered, or of metalline matter. Among the ancients, the burning mirrors of Archimedes and Proclus are famous. By the former, the Roman navy was set on fire and consumed, at the distance of a bow-shot; and by the latter, according to Zonaras, the navy of Vitellius, while besieging Byzantium, was burnt to ashes. By means of a mirror made by Valtette, a French artist of Lyons, a sixpence was melted in seven minutes and a half; and a half-

pointly in sixteen minutes. This mirror was 47 inches wide, and ground to a sphere of 76 inches radius; so that its focus was about 38 inches from the vertex. Its substance was a composition of tin, copper, and glass. A glass made by M. de Tschinghausen vivifies tiles, slates, pumice-stones, &c. in a moment. It melts sulphur, pitch, and all resins under water; the ashes of vegetables, woods, and other matters are transmuted into glass: every thing presented to its focus is either melted, turned into a salt, or dissipated in vapour.

BURNISHING, the art of polishing a metallic body, by a brisk rubbing of it with a burnisher, generally a round polished piece of steel. Book-binders burnish the edges of their books by rubbing them with a dog's tooth.

BURSARS, in the Scotch Universities, are youths chosen as exhibitors, and maintained for four years.

BRASS, a place for merchants to meet in and negotiate their business publicly, commonly denominated an **EXCHANGE**, which see.

BUSHEL, a measure of quantity for things dry; as grain, pulse, dry fruit, &c. containing four pecks, or eight gallons; or one eighth of a quarter.

A bushel, by 12 Henry VIII. c. 3, is to contain 8 gallons of wheat; the gallon eight pounds of troy-weight; the ounce twenty sterlings; and the sterling thirty-two grains, or corns of wheat growing in the midst of the ear.

This standard bushel is kept in the exchequer, and it is found to contain 2145.6 solid inches, and the water with which it has been filled weighed 1131 ounces, and fourteen penny-weights troy. By

act of parliament made in 1697, it is determined that every round bushel with a plain and even bottom, being 18 $\frac{1}{2}$ inches in diameter, and 8 inches deep, should be esteemed a legal Winchester bushel according to the standard in his majesty's exchequer. A vessel thus made will contain 2150.42 cubic inches; of course the corn gallon contains 261.8 cubic inches. Besides the standard or legal bushel, there are several local bushels of different dimensions in different places. But, by 31 Geo. III. c. 30, the bushel by which all corn shall be measured and computed for the purposes of this act, shall be the Winchester bushel, and a quarter shall be deemed to consist of 3 bushels: and all measures shall be computed by the stricken and not by the heaped bushel: and where corn shall be sold by weight, 57lbs. avoirdupois of wheat shall be deemed equal to one Winchester bushel.

Buss, a small sea vessel, used in the herring fishery, about 60 tons burden: it has two cabins, one at the prow and the other at the stern, the former serves for a kitchen.

Bust or busto, in sculpture, denotes the figure or portrait of a person in relieve, showing only the head, shoulders, and stomach, the arms being lopped off. The stomach and shoulders are, strictly speaking, the bust. The term is also used, by the Italians, for the torso or trunk of the body, from the neck to the hips. The bust is the same with what the Latins called *herma* from the Greek *hermes*, Mercury, the image of that God being frequently represented in that manner by the Athenians.

BUTMENTS, supporters or props on or against which the feet of arches rest.

BUTTER, the fat, oily, and inflammable part of milk. This kind of oil, in its natural state, is distributed through all the substance of the milk in very small particles, which are interposed between the caseous and serous parts, among which it is suspended by a slight adherence, but without being dissolved. It is in the same state as that of oil in emulsions; hence the same whiteness in milk and in emulsions; and hence, by rest, the oily parts separate from both these liquors to the surface, and form a cream. When butter is in the state of cream, its proper oily parts are not yet sufficiently united together to form an homogeneous mass. They are still half separated by the interposition of a pretty large quantity of serous and caseous particles. The butter is completely formed by pressing out these heterogeneous parts by means of continued percussion. It then becomes a uniform solid mass. Butter is constantly used in food. Fifty thousand tons have been computed to be annually consumed in London. Butter is a name given in old books of chemistry to several metallic muriates, on account of their texture when newly prepared. Hence there are the butters of Antimony, Arsenic, Bismuth and Tin. Thus butter of antimony is a compound of antimony and oxygenized muriatic acid, and is a muriate of antimony, and so of the rest.

BUTTON, an article of dress, intended as a fastening, made of various materials, as mohair, silk, horsehair, metals, &c. In making buttons of mohair, silk, &c. the material is previously wound on a bobbin, and the mould fixed to a board, by means of a bodkin thrust through the hole in the middle of it: this being done, the workman wraps the mohair,

round the mould in three, four, or six columns, according to the intended pattern of the button. A button is not finished when it comes from the maker's hands. The superfluous hairs and hubs of silk must be taken off; and the button rendered beautiful and glossy before it can be sold. This is done in the following manner: a quantity of buttons are put into a kind of iron sieve, called by workmen a *singeing box*; then, a little spirit of wine being poured into a kind of shallow iron dish, and set on fire, the workman moves and shakes the singeing box briskly over the flame of the spirit, by which the redundant parts are burnt off, without damaging the buttons. The mould of *gold twist buttons* is first wrapped round in the same manner as that of common buttons. This being done the whole is covered with a thin plate of gold and silver, and then wrought over with purle and gimp.

Boriness, a kind of buttment, built archwise, serving to support the sides of a building on the outside. They are used against the angles of towers, and on other occasions where the walls, unless very thick, would be liable, without this support, to be thrust out. They are also placed for a support and buttment at the feet of arches turned over great halls, &c.

Buxton Waters, are of two sorts, hot and cold. The former resemble those of Bristol; the latter, those of Tunbridge. See *Mineral Waters*.

Buxus, the box-tree, of which there are three species: 1. The *arborescens*, with oval leaves. 2. The *angustifolia*, with narrow leaves. 3. The *suffruticosa*, commonly used for bordering of flower-beds. The two first sorts, when suffered to grow

in a natural manner, are deciduous shrubs of a very elegant figure. There were formerly large trees of these kinds upon Boxhill, near Dorking in Surrey, in England. They are all easily cultivated. Box-wood is extremely hard and smooth, and therefore capable of being wrought with great neatness by the turner. It is used for the same reasons by engravers on wood.

BY-LAW, a law made either, or by the by, for the good of those that make it. All by-laws are to be reasonable, and for the common benefit, not the private advantage of particular persons, and must be agreeable to the public laws in being. In Scotland, these laws are called laws of the bar or barons.

C.

C, The third letter, and second consonant, of the alphabet, is pronounced like *k* before the vowels *a*, *e*, and *u*, and like *s* before *e*, *i*, and *y*. *C* is formed, according to Scaliger, from the *K* of the Greeks by retrenching the stem or upright line; though others derive it from the caph of the Hebrews, which has in effect the same form; allowing only for this, that the Hebrews read backwards, &c. the Latins, &c. forwards. As a numeral *C* signifies 100.

CABBALA, a mysterious kind of science, delivered by revelation to the ancient Jews, and transmitted by oral tradition to those of our times; serving for interpretation of the books both of nature and scripture.

CABLE, a thick, long three-strand rope, ordina-

rily of hemp, serving to hold ships firm at anchor and to tow vessels in large rivers. In Europe, the cables are commonly made of hemp; in Africa, of long straw or rushes called bass; and in Asia, of a peculiar kind of Indian grass. The term cable is sometimes also applied to the cordage used to raise massy loads, by means of cranes, wheels, and other like engines: though, in strictness, cable is not to be applied to ropes of less than three inches circumference. Every cable, of whatever thickness it be, is composed of three strands; each strand of three twists; and each twist of a certain number of caburns, or threads of rope yarn, more or less as the cable is to be thicker or smaller.

CADENCE, in music, the termination of an harmonical phrase; or a pause, or suspension, at the end of an air or some of its parts. Its use is very analogous to that of a point or stop in reading.

CADENCE, in reading, is a falling of the voice below the key-note at the close of every period. In reading, whether prose or verse, a certain tone is assumed, which is called the key-note; and in this tone the bulk of the words are sounded; but this note is generally lowered towards the close of every sentence.

CADMEAN LETTERS, the ancient Greek or Ionic characters, such as they were first brought by Cadmus from Phoenicia; whence Herodotus also calls them Phoenician letters. According to some writers, Cadmus was not the inventor, nor even importer of the Greek letters, but only the modeller and reformer of them, and it was hence they acquired the appellation Cadmean or Phoenician let-

ters; whereas before that time they had been called Pelasgian letters.

CADET, every son of a family, below the eldest. The word is adopted from the French. **Cadette**, a younger sister.

Cadet, one who enters a marching regiment as a private man, and receives pay accordingly, with the hope of promotion. In the East India service a cadet receives a commission as soon as he lands, but by sending out their officers as cadets, the company saves the pay during the voyage.

CADSI, or **CASHI**, a civil judge or magistrate in the Turkish Empire.

CADUCEUS, the rod or sceptre of Mercury, being a rod entwisted by two serpents, and tipped with wings, borne by that deity as the ensign of his quality and office. It was used by the Romans as a symbol of peace and concord: and thus, when they meant to offer to the Carthaginians the choice of war and peace, they sent a javelin and a caduceus. It is used on medals as an emblem, the rod signifying power; the serpents, prosperity or plenty; and the wings, diligence.

CAISSON, denotes a kind of chest, frame, or flat bottomed boat used in laying the foundation of bridges in deep or rapid rivers. The piers of such bridges are built in caissons. The most considerable work where caissons were used was Westminster bridge.

CALAMANCO, a fine sort of woollen stuff, manufactured in England and in Brabant. Some calamancoes are quite plain, others have broad stripes, adorned with flowers, and others plain stripes, &c.

CALAMINE, *lapis calaminaris*, a sort of mineral,

principally known as containing zinc, and therefore used in making brass. It is found in several parts of Europe; but the calamine of England is allowed, by the best judges, to be of the best kind. In some parts of Wales, it makes so large a portion of the common soil, as to have been used for mending the roads. See ZINC.

CALCINATION, in chemistry, the reducing of substances to a calx by fire; by this process, calcareous substances are reduced into quick lime; metal, into metallic oxides, or, as they were formerly termed, calces, and vegetable matters into white ashes. In metallurgic operations the term is employed to denote the process by which the ores are deprived of their water and salts, as a preliminary step towards the separation of the metal; and in this sense it may be considered as an advanced stage of roasting. The change which metallic bodies undergo in calcination is produced by the absorption of oxygen; hence the process, in this instance, is now called oxydation.

CALENDAR, or **KALANDAR**, a distribution of time as accommodated to the uses of life; or an almanac, or table, containing the order of days, weeks, months, feasts, &c. occurring in the course of the year: being so called from the word *calenda*, which among the Romans denoted the first days of every month, and anciently was written in large characters at the head of each month. See **KALANDAR**.

CALENDAR, Julian Christian, is that in which the days of the week are determined by the letters A, B, C, D, E, F, G, by means of the solar cycle and the new and full moons, particularly the paschal full moon, with the feast of Easter; and

the other moveable feasts depending upon it, by means of golden numbers, or lunar cycles, rightly disposed through the Julian year. See CHRONOLOGY, EASTER &c.

CALENDAR, *Gregorian*, is that which, by means of epacts, rightly disposed through the several months, determines the new and full moons, with the time of Easter, and the moveable feasts depending upon it, in the Gregorian year. This differs therefore from the Julian calendar, both in the form of the year, and in as much as epacts are substituted instead of golden numbers.

CALICO-ROLL, a machine used in manufactories, to press stuffs, silks, linsens, &c. to give them a fine gloss. This instrument is composed of two cylinders, round which the stuff is rolled, and they pass upon a smooth board loaded with several tons weight. When waves are required on the cloth, the weight gives the polish, and the waves are made by means of a shallow indenture on the roller.

CALIBRE, denotes the diameter of a body, but is usually applied to the bore of a gun, cannon, &c.

CALICO, a sort of cloth, resembling linen, and made of cotton. It is called calico, because originally brought from Calicut, a kingdom of India on this side of the Ganges, on the coast of Malabar. These cloths, whether plain, printed, dyed, stained, or painted, chints or muslins, are all included under one general denomination. The printing of calicoes commenced in London about the year 1676.

CALICO-Printing : the art of cloth-printing or calico-printing, in other words, of dyeing in certain

colours particular spots of the cloth, or figures impressed on it, while the ground shall be of a different colour, or entirely white, affords perhaps the most direct and obvious illustration of the application of chemical principles. The mordant which is principally used in this process is the acetate of argil. It is prepared by dissolving 3lbs. of alum and 1lb. of acetate of lead in 8lbs. of warm water. An exchange of the principles of these salts takes place: the sulphuric acid of the alum combines with the oxyde of lead, and the compound thus formed being insoluble is precipitated, the acetic acid remains united with the argil of the alum in solution. Some calicoes are only printed of one colour, others have two, others three or more, even to the number of eight, ten, or twelve. The smaller the number of colours, the fewer in general are the processes.

1. One of the most common colours on cotton prints is a kind of nankeen yellow, of various shades down to a deep yellowish brown, or drab. It is usually in stripes or spots. To produce it, the printers besmear a block, cut out into the figure of the print, with acetate of iron, thickened with gum of flour; and apply it to the cotton, which, after being dried and cleansed in the usual manner, is plunged into a potash-ley. The quantity of acetate of iron is always proportioned to the depth of the shade. 2. For yellow the block is besmeared with acetate of alumine. The cloth, after receiving this mordant, is dyed with quercitron bark, and then bleached. 3. Red is communicated by the same process; only madder is substituted for the bark. 4. The fine light blues which appear so often on

printed cottons are produced by applying to the cloth a block besmeared with a composition, consisting partly of wax, which covers all those parts of the cloth which are to remain white. The cloth is then dyed in a cold indigo vat ; and after it is dry, the wax composition is removed by hot water.

5. Lilac, flea brown, and blackish brown, are given by means of acetite of iron ; the quantity of which is always proportioned to the depth of the shade. For very deep colours, a little sumach is added. The cotton is afterwards dyed in the usual manner with madder, and then bleached. 6. Dove colour and drab, by acetite of iron and quercitron bark. When different colours are to appear in the same print, a great number of operations are necessary. Two or more blocks are employed, upon each of which that part of the print only is cut, which is to be of some particular colour. These are besmeared with different mordants and applied to the cloth, which is afterwards dyed as usual.

CALIPH, the chief sacerdotal dignity, among the Saracens or Mahometans, vested with absolute authority in all matters relating both to religion and policy. In the Arabic, it signifies *successor or vicar* ; the caliphs bearing the same relation to Mahomet as the Popes to Jesus Christ, or St. Peter. It is at this day one of the Grand Signior's titles, as successor, of the Prophet ; and of the Sophi of Persia, as successor of Ali. The government of the original caliphs continued from the death of Mahomet till the 655th year of the hegra.

CALL, a sort of whistle or pipe, used by the boatswain, on board ship, to summon sailors to their em-

ployments, and it is sounded in various strains, according to the different exercises.

CALLING the House, in parliamentary proceedings, is the calling over the names of the members, every one answering to his own, and going out of the house in the order in which he is called. This is done in order to discover whether there be any person present not a member of the house, or whether any member be absent without its leave.

CALORIC, a term employed in the new chemical nomenclature to denote the cause of heat, as distinguished from the sensation. Heretofore the language of chemistry had been perplexed by the use of the word 'heat' to express both these ideas indiscriminately; it is therefore with great propriety that the latter term is now applied to one of the effects of that principle, which, as the cause of that effect, is denominated caloric; and it would conduce very much to perspicuity of expression, if this distinction, both in speaking and writing, were uniformly regarded.

The principal sources of caloric are, the sun, combustion, and various other instances of chemical action, percussion or collision, friction, the elective spark, and galvanism.

Caloric is always sensible and never latent. The proportion of it in any body is always sufficiently indicated either by its temperature or its state, with regard to the counterpoise of those attractive and repulsive powers of which we have been speaking; and no change can take place in that proportion without its occasioning a concomitant change in one or other of these affections.

CALVINISM, the doctrine and sentiments of John Calvin, who flourished at Geneva about the year 1541. The doctrinal parts of this system differ from that of other reformers of Calvin's period, chiefly in what regards the absolute decrees of God, by which, according to this teacher, the future and eternal condition of the human race was determined out of his sovereign will: that is, Calvin denied the free agency of man, and maintained predestination. In France, the Calvinists are distinguished by the name of *Huguenots*. In Germany, they are confounded with the Lutherans, under the general title of *Protestants*; or sometimes distinguished by an addition of the epithet *reformed*.

CALUMET, a symbolical instrument of great importance among the Indians of America. It is a smoking-pipe, the bowl of which is generally made of a soft red marble, and the tube of a very long reed, ornamented with the wings and feathers of birds. This instrument, the use of which bears a great resemblance to the caduceus of the Greeks, is on all occasions a pledge of peace and good faith.

CALX. See *OXYDE*.

CALYX. See *BOTANY*.

CAMBLET, a stuff, the chief places of manufacture of which are England, Holland, and Flanders. Brussels exceeds them all in the beauty and quality of its camblets, and those of England are reputed the second. The true oriental camblet is made of the pure hair of the goat of Angora; which animal is the wealth of that city, furnishing all its inhabitants with employment. Wool, silk, and hair are used in this manufacture; sometimes severally, and sometimes together.

CAMBRIC, a species of linen, made from very fine and white flax, deriving its name from the city of Cambray, where it was first manufactured. The cambrics now worn in Great Britain are chiefly made in Scotland and Ireland.

CAMEL, in natural history. This animal is found in Asia and Africa, and is easily domesticated. Camels are patient of labour, and will carry immense weights. They will travel eight or ten days without water, which they scent at a distance of half a league, and drink most copiously when they reach it. Besides the four stomachs peculiar to other ruminating animals, they have a fifth for the purpose of holding water, which they can preserve unmixed with the other liquors of the body, and from this stomach, they can, by the contraction of certain muscles, make the water mount into their throats and proper stomachs to macerate their dry food. They kneel down to be loaded and unloaded, at the command of their keepers. The milk and flesh of camels are used as food, and their hair is used in the manufactures of the most costly stuffs. The **CAMELOPARD** is a native of several parts of Africa, living in forests, and on the leaves, as food. It is mild and inoffensive, and, in cases of danger, has recourse to flight for safety. When obliged to stand on self-defence, it kicks its adversary. Its usual pace is a quick trot. The camelopard was introduced into Europe anciently by Julius Caesar; and in more modern times, one was presented in the 16th century by the Dey of Tunis to Laurentius de Medicis. See Pl. I. Natural History. Fig. 1 and 2.

CAMEL, in mechanics, an ingenious machine, by

means of which vessels are raised over bars that would otherwise interrupt their course. The camel was invented by De Wit, for the use of Holland, and carried to Petersburg by the czar. A camel is composed of two separate parts, whose outsides are perpendicular, and whose insides are concave; shaped so as to embrace the hull of a ship on both sides. Each part has a small cabin, with sixteen pumps and ten plugs, and containing twenty men. The two parts are braced to the ship, under water, by means of cables, and, when fitted intirely, in close its sides and bottom. Being towed to the bar, the plugs are opened, and the water admitted until the camel sinks with the ship, and runs aground. Then, the water being pumped out, the camel rises, lifts up the vessel, and the whole is towed over the bar. This machine, which is thought to strain very large ships, can raise the vessel eleven feet; that is, make her draw so many feet less water.

CAMERA-OBSCURA, or *dark chamber*, a machine or apparatus, in which the light being collected and thrown through a single aperture, external objects are exhibited distinctly, and in their native colours, on any white surface placed within the chamber or receptacle. A miniature picture, thus set forth in the most accurate and natural manner, is in all cases a pleasing object; and, consequently, the *camera obscura* furnishes a source of elegant amusement. To those unhabituated to sketching, it affords an opportunity of delineating objects and prospects with the utmost exactness; and a painter cannot study these living pictures from the very pencil of nature herself, without deriving considerable advantage.

CAMP, the ground on which an army pitches its tents. An army always encamps in the front of the enemy; and generally in two lines, running parallel, at about 500 yards distance from each other; the horse and dragoons on the wings; and the foot in the centre.

CAMPAIGN, in the art of war, denotes the space of time in which an army acts on the offensive, or is encamped.

CAMPHOR, or **CAMPHERE**, a solid concrete juice, extracted from the wood of the *laurus-camphora*, a native of the eastern parts of Asia. It exists ready formed in the wood of this tree, and is obtained by sublimation. The wood is cut into small pieces, and exposed with a little water to a moderate heat, in an alembic, to the head of which is adapted a capital in which straw is put. The camphor is volatilized, and attaches itself to the straw. A second sublimation renders it pure, and in this process it is fitted to be made into cakes.

CANAL of communication, a cut of water furnishing an artificial means of navigation. This is one of the most useful as well as arduous labours in which the industry of man has been employed. The difficulties surmounted, and the magnitude of the work, are often, in these cases, objects of equal admiration. The canal of Languedoc, in France, by which the main ocean communicates with the Mediterranean, by a navigation of 64 leagues; and that which runs 825 miles from Canton to Pekin, in China, are among the most remarkable at present in existence. Within these few years, a great number of canals have been cut in Great Britain. Most of the counties between the mouth of the Thames

and the Bristol-channel are now connected together by natural or artificial navigations. The most extensive on the island are the duke of Bridgewater's in Cheshire, and that between the Forth and the Clyde in Scotland. The obstacles that present themselves, in an enterprize of this kind, are generally various and innumerable. If the ground to be cut were a dry level, nothing but a reservoir of water would be necessary: but if the course is to pass through marshes, mountains, and rocks, and over rivers and vallies, it is easy to perceive that the engineer must have constant employment for his invention, the labour and expence will be enormous, and the progress frequently tedious. In one place, a tunnel is to be cut through a hill or quarry; in another, an aqueduct-bridge is to be thrown over water, or across a dale. Beside these grand impediments, the general inequality of the ground renders it necessary to provide locks, in order to raise or lower the water to a level which, along the whole course, is perpetually varying. The largest canal in England is that which runs across the Isle of Dogs, being between 40 and 50 yards wide.

CANCER, in astronomy, one of the twelve signs of the zodiac, represented on the globe in the form of a crab, and marked ♋ in the books.

CANCER, the crab, in natural history, is reckoned among the insects. Crabs have eight legs: they cast their shells annually; previously to this their limbs shrink to facilitate their extrication. The loss of a limb, with other animals, is irreparable, but with regard to crabs it is but of little importance; as in a few weeks another is reproduced. The lobster is a species of the crab: this is extremely prolific,

[illegible]

Fig. 2. *Camelopardalis giraffe* the Camelopard.
Fig. 3. *Cancer norvegicus* Norway Crab.
Fig. 4. *Cancer grapsus*, Streaked Crab.
Published by J. Harris, S^t Pauls (2^d T^r) 1821.

Hence mould candles are more economical than common candles, if they remain at rest while burning.

CANDLEMAS, a feast of the church, held on the 2nd of February, in honour of the purification of the Virgin Mary. On that day, the ancient Christians used an abundance of lights, both in their churches and in processions. Candlemas term begins the 15th of January, and ends the 3d of February.

CANIS, the dog. The chief peculiarities of the tribe of dogs are these. They cultivate the society of men, and are but rarely found wild: they feed on flesh and farinaceous vegetables: they digest bones: they are extremely docile, affectionate and vigilant in their intercourse with men: they have an aversion from strangers, and particularly beggars. They are capable of imitation and instruction, and in many instances seem endowed with almost human intelligence. It is said that a Florentine nobleman had a dog that would wait at table, change his plates, and carry his wine with the utmost steadiness. About the year 1806 a watchman in the neighbourhood of London fell down the deep area of a new house, and was unable to rise, his dog ran to the nearest public house, and made the most pitiful moans; but could get no assistance, he ran back to his master, then to the public house, till at length a person followed him, extricated the master, and received from the affectionate animal the most grateful acknowledgments.

CANOE, the small boat or primitive ship of simple nations. In all instances, these have generally been found of a construction and magnitude ade-

quate to the undertakings for which they are designed : for it is increasing necessities that enlarge the bounds of science, and multiply the efforts of invention. The materials most at hand have commonly supplied the savage with his bark. In some places, he has formed a basket coated with hides ; in others, he has taken a hollow tree for his model, and the Eskimaux have even proceeded to place the ribs of their vessels on stocks, to bend branches to the requisite shape, and cover the whole with the bark of the birch. On the coast of Africa, amid a dangerous surf, the natives travel with incredible swiftness, in canoes easily upset, and as easily righted.

CANNON. See GUN.

CANON, a person who possesses a prebend, or revenue allotted for the performance of divine service in a collegiate or cathedral church.

CANON, in church government, a law or rule, either of doctrine or discipline, enacted especially by a council, and confirmed by the authority of the sovereign. The word is also used for the authorised catalogue of the sacred writings.

CANONIZATION, an act of the Romish church, by which it takes upon itself to rank a deceased person among the catalogue of its saints.

CANTATA, a song, or composition, intermixed with recitatives, airs, and different movements, chiefly intended for a single voice, with a thorough bass, though sometimes with other instruments.

CANTEEN, is a small vessel usually made of tinned plate, or wood, in which soldiers when on their march, or in the field, carry their liquor. The wooden canteens generally used in the British

armies are cylindrical, $7\frac{1}{2}$ inches diameter and 4 inches long outside ; they contain about three pints.

CANTHARIDES, insects used to raise blisters. They differ in their size, shape, and colour : they are of the most brilliant colours. Those who collect them, tie them in a bag or piece of linen cloth, which they hang in the vapour of hot vinegar till the insects are dead. The cantharides of Mount Etna are reckoned better than those of Spain.

CANTICLES, the Song of Songs, in the Bible, supposed to be a marriage song written by Solomon, to be explained by compositions of a similar nature in Eastern countries. By other writers it is supposed to be a series of poems each distinct and independent of the other. By them the canticles are regarded as sacred idyls.

CANTO, a song which is used for a division of a poem supposed to make one song, or a portion sung at one time.

CANTON, a small division : hence, in heraldry, a small square, separated from the rest of the coat, is called a *canton* ; in military affairs, troops billeted into different quarters or divisions, are said to go into *cantonments* ; in geography, a small distinct country, such as the Swiss *cantons*.

CANVAS, a coarse sort of cloth, of which there are several kinds. Among others, are 1. That worked regularly in little squares as a basis for tapestry : 2. That called buckram ; 3. The cloth used for pictures ; 4. That employed for sails of ships.

CAOUTCHOUC, or India Rubber, improperly called elastic gum, is obtained from the juice of a

tree found in Guiana, and other parts of South America.

CAP, of *maintenance*, one of the ornaments of state, carried before the kings of England at the coronation, and other great solemnities. It is of crimson velvet faced with ermine. It is frequently met with above the helmet, instead of wreaths, under gentlemen's crests.

CAPE of *Good Hope*, the Southern extremity of Africa, discovered by the Portuguese. The chief town is called Cape Town, rising in the midst of a desert surrounded by black and dreary mountains. Of these mountains the Table Mountain is the principal, the view from which is amazingly extensive.

CAPILLARY tubes, those the diameter of which is scarcely larger than to admit a hair: See **HYDROSTATICS**.

CAPITAL, in architecture, the uppermost part of a column or pilaster, serving as a head, and placed immediately over the shaft, and under the entablature: it is made differently in the different orders, and is that which principally characterises the orders. See **ARCHITECTURE**.

CAPITAL stock, among merchants, bankers, and traders, signifies the sum of money which individuals bring to make up the common stock of a partnership when it is first formed. It is also said of the stock which a merchant at first puts in trade for his account. It likewise signifies the fund of a trading company or corporation, in which sense the word stock is generally added to it. Thus we say 'the capital stock of the bank,' &c. The word

capital is opposed to that of profit or gain, though the profit often increases the capital, and becomes of itself part of the capital when joined with the former.

CAPITOL, a famous fort or castle on the Mons Capitolinus at Rome, wherein was a temple dedicated to Jupiter, thence also denominated Capitoli-nus, in which the Senate anciently assembled; and which still serves as the city hall or town-house, for the meeting of the conservators of the Roman people. It had its name *capitol*, from *caput*, "a man's head;" one having been found fresh and bleeding upon digging the foundation of the temple built in honour of Jupiter. Arnobius adds that the man's name was *Tolus*; whence *caput-tolium*.

CAPRA, the goat, is domesticated in every part of the globe. He resembles the sheep, but is more alert, and possesses more sentiment and intelligence. He is won by kindness, will climb the most steep and terrific precipices. He lives on herbs, but prefers barren heaths to luxurious fields. The Syrian goat is remarkable for its pendulous ears, and is common in various parts of the East. The animals of this species are driven in flocks through the oriental towns every morning and evening, in order to supply the inhabitants with milk. Fig. 6.

CAPRIFICATION, a method used in the Levant for ripening the fruit of the domestic fig tree, by means of insects bred in that of the wild fig tree. The caprifigation of the ancient Greeks and Romans corresponds in every circumstance with what is practised at this day in the Archipelago, and in Italy. These all agree in declaring that the wild

fig tree, *caprificus*, never ripened its fruit ; but was absolutely necessary for ripening that of the garden or domestic fig tree, over which husbandmen suspend its branches. The reason of this success has been supposed to be, that by the punctures of these insects the vessels of the fruit are lacerated, and thereby a greater quantity of nutritious juice derived thither. Perhaps too, in depositing their eggs the gnats leave behind them some sort of liquor proper to ferment gently with the milk of the figs, and to make their flesh tender.

CAPSTAN, in a ship, a large piece of timber, in the nature of a windlass, placed behind the main-mast, used for weighing, or raising up anchors, or any other purpose in which great force is required.

CAPTAIN, a military commander. A *captain in the army* commands a troop of horse, or a company of foot, under a colonel. In the horse and foot guards, the captains have the rank of colonels. It is the duty of this officer to superintend the discipline and well-being of his men ; and he has the power of appointing his own serjeants, corporals, and lanspesades. A *captain in the navy* is an officer who commands a ship of the line of battle, or one that carries at least twenty guns. His charge is very extensive ; inasmuch as he is answerable not only for the military government, navigation, and equipment of the ship he commands, but also for the conduct of his inferior officers.

CARABINE, a short piece of fire-arms, having a barrel two feet and a half long, carrying a ball of the weight of the 24th of a pound.

CARAT or **Caract**. 1. A weight of four grains. 2. A manner of expressing the fineness of gold ; an

ounce is divided into twenty-four parts, if of the mingled mass two or three or four parts out of four and twenty be base metal, the whole is said to be 22, 21, or 20 carats fine.

CARAVAN, or *karavane*, a company of travellers and pilgrims, and more particularly of merchants; who, for their greater security, and in order to assist each other, march in a body through the deserts and other dangerous places, which are infested with Arabs or robbers.

CARAVANSERA, a sort of inn, the erection of which is generally an act of charity among the Mahometans. It commonly consists of a large square court, surrounded by piazzas, under which, supplied with a resting place, and secure from robbers, man and beast take up their lodging for the night. In the upper part, there are generally private apartments, the use of which is costly.

CARBON, or pure coal, the radical of carbonic acid, is a term introduced by the French chemists to denote the pure or essential part of charcoal. Though this substance abounds throughout the vegetable kingdom, and is also contained in animal and even mineral bodies, yet it is very rarely to be met with in a state of absolute purity; it is indeed remarkable, and would be almost incredible if the results of modern chemistry did not render it indisputable, that the most valuable of all the gems, the diamond, is nothing but pure crystallized carbon. For many ages the diamond was considered as incombustible; and Newton was the first person who conjectured, from its great refractive power, that it was capable of combustion. This conjecture was verified before the death of

that illustrious man, by the members of the Academy Del Cimento at Florence, who, in 1691, consumed several diamonds by placing them in the focus of a burning lens. Other philosophers repeated the experiment with the heat of a furnace: and the nature of the diamond was at length ascertained by the successive attempts of Lavoisier, Morveau, and Tennant. Carbon, in the state of diamond, is transparent, crystallized, intensely hard, and perfectly colourless. In oxygen gas it burns with great heat, like other combustible bodies, attracting the oxygen, and at length is wholly converted into carbonic acid gas. Carbon combines with iron, and converts it into steel; it may be united with sulphur, copper, &c. forming with them carburets of sulphur, copper, &c. Steel is a carburet of iron, so is black lead as it is called, the proportions of carbon differ in each substance.

CARBONIC Acid Gas, carbonic acid (i. e. carbon and oxygen) combined with caloric. The carbonic acid gas (fixed air of the lungs) is the result of the combination of about 72 parts in weight of oxygen and of 28 parts of carbon.

CARBONIC Oxyde, or gaseous oxyde of carbon, is compounded also of carbon and oxygen, but with a less proportion of the latter than is necessary to constitute an acid.

CARBUNCLE, in natural history, a very elegant gem, whose colour is deep red, with an admixture of scarlet. It has yet been found only in the East Indies, and there but very rarely.

CARDS, were invented about the year 1390, to divert Charles VI. of France, who had fallen into a melancholy disposition. The inventor proposed,

by the figures of the four suits, or colours as the French call them, to represent the four classes of men in the kingdom. By the *cœurs* (hearts) are meant the *gens de chœur*, choir-men, or ecclesiastics; and therefore the Spaniards, who certainly received the use of cards from the French, have *copas*, or chalices, instead of hearts. The nobility, or prime military part of the kingdom, are represented by the ends or points of lances or pikes: the Spaniards have *espadas*, swords, in lieu of pikes; and hence we call them spades. By diamonds are designed the order of citizens, merchants, or tradesmen, *carreaux* (square stones, tiles, or the like): the Spaniards have a coin (*dentro*) which answers to it; and the Dutch use the word *streeneen* (stones or diamonds), on account of the form of what is here called *carreaux* by the French. Trefle, the trefoil-leaf, or clover-grass (corruptly called *clubs*), alludes to the husbandmen and peasants. The Spaniards appear to have substituted *bastos* (staves or clubs), and we too have given the Spanish name to the French figure. The four kings, which the French, in drollery, sometimes call the *cards*, are David, Alexander, Cæsar, and Charles; which names were, and still are, on the French cards. The first three of these names represent the celebrated monarchies of the Jews, Greeks, and Romans, and the last that of the Franks, under Charlemagne. By the queens are intended Argine, Esther, Judith, and Pallas (names retained on the French cards) typical of birth, piety, fortitude, and wisdom, the qualifications severally attributed to the persons named. Argine is an anagram for *regina*, a queen by descent. By the knaves were intended

the servants of knights (*knave* originally meaning a servant) ; but pages and valets, now indiscriminately used by various orders of persons, were formerly only allowed to men of quality, under the name of esquires (*escuivers*, shield or armour-bearers.)

CARDINAL, which, in a general sense, and as an epithet, signifies principal or pre-eminent, is formed of the Latin word *cardo*, a hinge, agreeably with the common expression, in which it is said of an important matter, that every thing turns upon it : thus Justice, Prudence, Temperance, and Fortitude are called the four cardinal virtues. The cardinal signs, in astronomy, are Aries, Libra, Cancer, and Capricorn. The cardinal points of the compass, north, south, east, and west.

CARDINAL, in the Roman hierarchy, an ecclesiastical prince and subordinate magistrate, who has a voice in the conclave at the election of a Pope, and who may be advanced to that dignity himself. The dress of a cardinal is a red soutanne, a rocket, a short purple mantle, and a red hat ; and his title of address, ' His eminence.'

CAREENING, in sea-language, the bringing a ship to lie down on one side, in order to trim and caulk the other.

CARILLONS, a species of chimes frequent in the Low Countries, particularly at Ghent and Antwerp, and played on a number of bells in a belfrey, forming a complete series or scale of tones or semitones, like those of the harpsichord and organ.

CARNELIAN, a precious stone, either red, yellow, or white. The finest carnelians are those of the East Indies ; there are some beautiful ones in the

rirent of Silesia and Bohemia ; and some of a quality not to be despised in Britain. The use to which they are is most generally applied is that of seats.

CARNIVAL, a period previous to Lent, celebrated with great spirit throughout Italy, and during which feasts, balls, operas, concerts, intrigues, marriages, &c. abound. The churches are filled with choristers, and the streets with masks. This festival flourishes more particularly at Venice, where it begins on the second holiday in Christmas, and where it boasts to have had at one time seven sovereign princes and thirty thousand foreigners among its votaries.

CARPET, a thick cloth, of wool or other materials, the most valuable of which are made in Persia and Turkey. Paris, however, is said to produce carpets of an equal if not superior quality. In Germany, a variety of carpets are manufactured. The most esteemed carpets of British make are the Wilton.

CARTEL, an agreement between two states for the exchange of their prisoners of war. A *cartel-ship*, a ship commissioned in time of war to exchange the prisoners of any two hostile powers ; also to carry any particular request from one power to another. The officer who commands her is ordered to carry no cargo, ammunition, or implements of war, except a gun for the purpose of firing signals.

CARTESIANS, those who adhere to the opinions of Des-Cartes. This philosopher has laid down two principles, the one metaphysical, the other physical. The metaphysical proposition is this : " I think, therefore I am ;" the physical one, " Nothing exists but substance." Substance he makes of

two kinds, the one a substance that thinks, the other a substance extended ; whence actual thought and actual extension are the essence of substance. He reasons against the possibility of a vacuum.

CARTILAGE, a white, elastic, shining substance growing to the bones, and commonly called gristle. Some cartilages cover the moveable articulations of the bones, and others unite one bone with another.

CARTILAGINOUS fishes, those which have a cartilaginous instead of a bony skeleton. Dr. Shaw and others have united the *Branchiostegi* and *Chondropterygii* fishes under the general title of *Cartilaginei*. Linnæus separated the cartilaginous from the other fishes, and placed them in the class *Amphibia*, where they constituted the order *Nantes*.

CARTOON, from *carta*, paper, and *oni*, large [Italian], a design drawn upon large sheets of paper for the purpose of being traced upon any other substance, where the subject is to be finished. The most famous are those of Raphael, seven of which, after having lain in the store-rooms of a tapestry manufactory, from the age of Leo X. and suffered various rough usage, were purchased by Charles I. of England, and are now at Windsor-castle.

CARTOUCHE, in the military art, a case of wood about three inches thick at the bottom, girt with marlin, holding about 400 musket balls, besides 6 or 8 balls of iron of a pound weight to be fired out of a howitzer for the defence of a pass.

CARVING, the art or act of cutting or fashioning a hard body, by means of a chissel or other sharp instrument. The term *carving* is generally applied when wood is the body carved: the same operation upon stone being denominated *sculpture*.

In carving a figure or design, the outline must first be drawn or pasted on the wood. The wood fittest for the use is that which is hard, tough, and close ; as beech, but especially box.

CARYATIDES, in architecture, an order of columns or pilasters, under the figure of women, dressed in long robes, after the manner of the Carian people, and serving instead of columns to support the entablement.

CASE, in grammar, implies the different inflections and terminations of nouns, serving to express the different relations they bear to each other and to the things they represent. See **GRAMMAR**.

CASEHARDENING of iron is a superficial conversion of that metal into steel by the ordinary method of conversion, namely, by cementation with vegetable or animal coals. This operation is generally practised upon small pieces of iron wrought into tools, and instruments to which a superficial conversion is sufficient, and it may be performed conveniently by putting the pieces of iron to be casehardened, together with the cement, in an iron box, which is to be closely shut and exposed to a red heat during some hours. — By this cementation, a certain thickness from the surface of the iron, will be converted into steel, and a proper hardness may be afterwards given by sudden extinction of the heated pieces of converted iron in a cold fluid.

CASSIOPEIA, a constellation in the northern hemisphere, situated opposite the great bear, on the other side the pole. In the year 1572, a remarkable new star appeared in this constellation, surpassing Sirius or Lyra in brightness. It appeared bigger

than Jupiter, but after a few months it declined ; and in a year and a half entirely disappeared.

CAST, among artists, any statue or part of a statue, of bronze, or of plaster-of-Paris. A cast is that which owes its figure to the mould into which the matter of it has been poured or cast while in a fluid state ; and thus differs from a model, which is made by repeated efforts with a ductile substance, as any adhesive earth ; and from a piece of sculpture, which is the work of the chissel.

CAST, in Indian polity, a tribe, or grand division of the people. By this establishment, the lot of every individual is hereditarily fixed. The highest cast is religious ; the second warlike ; the third commercial ; and the fourth infamous. The names of the three latter of these are differently reported. Persons of the religious cast are universally denominated *Bramins* ; the soldiers or princes are styled *Cuttery* or *Rajahs* ; the traders, *Choutres* or *Shuddery* ; the lowest order, *Parias* or *Tyse* ; but this statement is probably incorrect.

CASTING, in foundery, the running of metal into a mould : among sculptors, it is the taking casts or impressions of figures, &c. Plaster-of-Paris is the most usual material employed for this purpose. This, when bought at the shops, requires no other preparation than that of a careful mixture with water, to the thickness of treacle, when it may be poured into the mould. It dries, or *sets*, in a short time, and ever afterward retains a sufficient degree of hardness.

CASTLE, a fortress or defensible place. Mr. Grose, the Antiquarian, was of opinion, that the

English castles, walled with stone, and designed for residence as well as defence, are for the most part of no higher date than the conquest. Those previously erected had been suffered to fall into ruin ; and many writers have assigned this circumstance as a reason for the facility with which the duke of Normandy made himself master of the country. It was the policy of this able general to build a considerable number ; and in process of time the martial tenants of the crown erected them for themselves ; so that, toward the end of Stephen's reign, we are told that there existed no less than eleven hundred and fifteen. At this period castles were an evil of the greatest magnitude to both the sovereign and the subject ; considerable struggles appear to have taken place with regard to their continuance ; several were demolished ; and their general decline commenced. A complete castle consisted of a ditch or moat, an outwork, called a barbican, which guarded the gate and drawbridge ; an artificial mount ; an outer and inner ballium or inclosure ; and the keep, or lofty tower, in which the owner or governor resided, and under which were the dungeons.

CASTLE, in sea-language: the forecastle is the uppermost deck, toward the boltsprit ; and the hind-castle, which is no longer spoken of, the quarter-deck. The appellation of castle is easily accounted for by referring to representations of ancient ships, in which the castellated style of building is used, the decks having their turrets and battlements.

CASTOR, the beaver, found chiefly in North America, famous for its policy and neatness in

building, by means of trees, and their branches, which it fells, and drives into the ground with much dexterity. Beavers make use of stone, wood, and a sandy kind of loam in their structures, which by their compactness preclude injury from the winds and rain. The instruments made use of by the beaver in its operations are their teeth to cut down the trees, and take off the branches, their feet for driving the stakes into the ground, and their tails for laying on the mortar. Fig. 6. Nat. Hist.

CASUIST, one who propounds the doctrine and science of conscience and its cases, with the rules and principles of resolving the same.

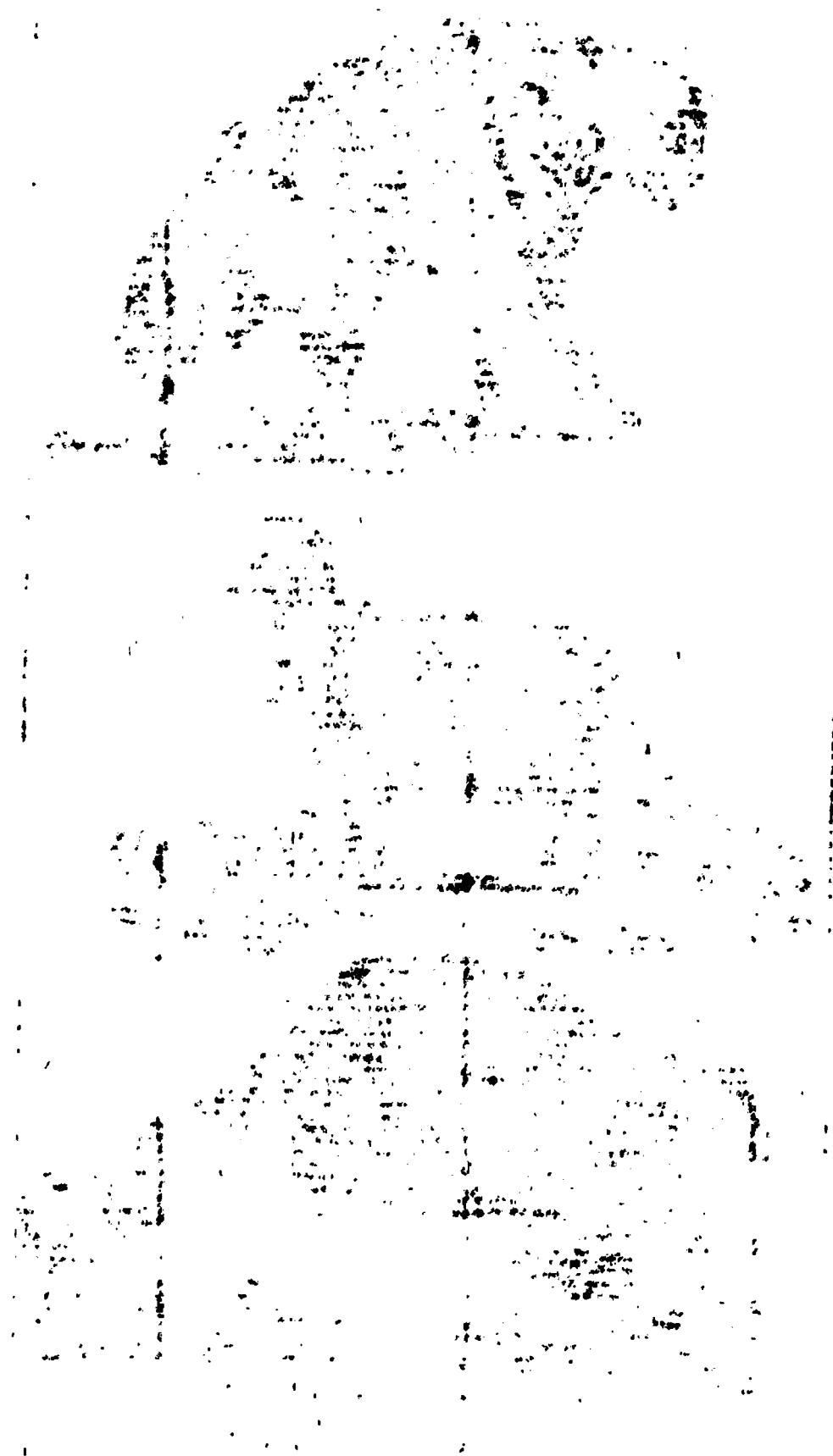
CATACOMB, a sepulchre or subterraneous chamber, containing cells for a great number of dead bodies. They are frequent in Italy and Egypt.

CATARACT of water : a fall or precipice, in the channel, or bed of a river ; caused by rocks or other obstacles, stopping the course of its stream from whence the water falls with a noise and impetuosity. Such are the cataracts of the Nile, the Danube, Rhine, &c. In that of Niagara the perpendicular fall of the water is 137 feet.

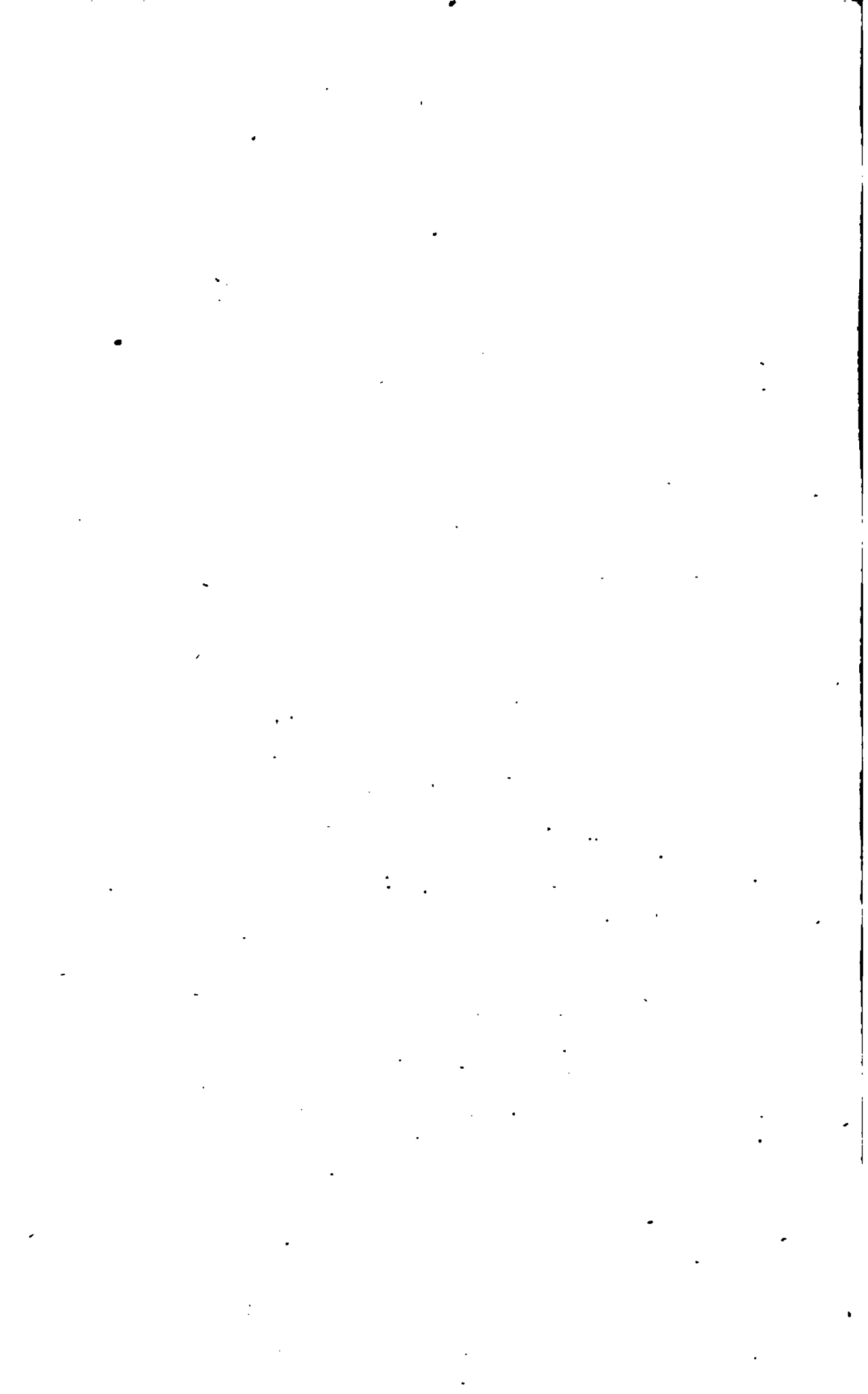
CATCH, in music, is defined by Mr. Jackson to be " A piece for three or four voices, one of which leads, and the others follow in the same notes."

CATHEDRAL, a church in which is a bishop's see, or seat. The word is from the Greek, signifying a " chair."

CATHOLIC, any thing that is general or universal. The Romish church distinguishes itself by the name of *Catholic*, in opposition to all those which have separated themselves from her Communion, considering herself as the only true and Christian



[illegible]



church. In the strict sense of the word, there is no Catholic church in being ; that is, no universal Christian Communion.

CATOPTRICS, that part of optics which explains the properties of reflected light, and particularly that which is reflected from mirrors.

CAVALIER, an armed horseman or knight, called by the French a *chevalier*.

CAVALRY, a body of soldiers that charge on horseback. Their chief use is to make frequent excursions to the disturbance of the enemy, intercept his convoys, and destroy the country ; in battle, to support and cover the foot, to break through and disorder the enemy, and to secure the retreat of the foot.

CAVEAT, an entry in the Spiritual Courts, by which the probate of a will, letters of administration, licence of marriage, &c. may be prevented from being issued without the knowledge, and, if the reason be just, the consent of the party entering the caveat.

CAUKING, or *caulking a ship*, is driving a quantity of oakum into the seams of the planks. After the oakum is driven very hard into these interstices, it is covered with melted pitch to keep the water from rotting it.

CAUSE, that from whence any thing proceeds, or by virtue of which any thing is done : it stands opposed to effect. We get the ideas of cause and effect from our observation of the vicissitude of things, while we perceive some qualities or substances begin to exist, and that they receive their existence from the due application and operation of other beings. That which produces is the cause ;

and that which is produced, the effect : thus, fluidity in wax is the effect of a certain degree of heat, which we observe to be constantly produced by the application of such heat.

CAUSEWAY, a common, hard, raised road, made for the convenience of travelling.

CAUSTIC, in chemistry, a fixed alkaline salt, deprived of its carbonic acid, and most of its water by means of quick lime, evaporation and fusion. The alkali used for this purpose is generally pot-ash, and the form that is chosen is the lixivium of the soap-boilers, which is evaporated to dryness in a copper or silver vessel, fused in a crucible, poured into a bason, and when solid cut into small pieces, which must be kept in a bottle well closed to prevent deliquescence. If a piece of this caustic be applied to the skin, it corrodes it in about half or three quarters of an hour, producing a painful eschar like that which is occasioned by burning ; and forming most probably a saponaceous compound with the fat-parts of the skin, or flesh.

CAUTERY, in surgery, a remedy by which solid parts of the body may be burnt, ate, or corroded away. The *actual cautery* is a red-hot instrument, usually of iron ; the *potential cautery*, a corroding substance.

CEMENT, in a general sense, any glutinous substance capable of uniting and keeping things together in close cohesion. In this sense the word cement comprehends mortar, solder, glue, &c. but has been generally restrained to the compositions used for holding together broken glasses, china, and earthenware. For this purpose the juice of garlick is recommended as exceedingly proper,

being both very strong, and, if the operation is performed with care, leaving little or no mark. Quick-lime and the white of an egg mixed together and expeditiously used, are also very proper for this purpose. Dr. Lewis recommends a mixture of quick-lime and cheese in the following manner: "Sweet cheese shaved thin, and stirred with boiling-hot water, changes into a tenacious slime; which does not mingle with the water. Worked with fresh parcels of hot-water, and then mixed upon a hot stone with a proper quantity of unslaked lime, into the consistence of a paste, it proves a strong and durable cement for wood, stone, earthen-ware and glass. When thoroughly dry, which will be in two or three days, it is not in the least acted upon by water.

CEMENTATION, in the arts, a general method of forming steel from iron, by means of the application of charcoal. In a proper furnace layers of bars of malleable iron and layers of charcoal are placed one upon another, the air excluded, the fire is raised to a great height, and kept up for eight or ten days. If after this the conversion of the iron into steel be complete, the fire is extinguished, and the whole is left to cool for six or eight days longer. Iron prepared in this manner is named blistered steel, from the blisters which appear on its surface. Copper is converted into brass by cementation with the powder of calamine and charcoal.

CENOTAPH, in antiquity, an empty tomb, erected in honour of the deceased, and differing from a sepulchre, in which the body was actually deposited.

CENT, from *centum*, "a hundred," is used in commercial concerns to signify a hundred pounds. A profit of 10 *per cent*, is the gain of 10% by the use of 100%.

CENTAUR, in classic antiquity, a monster, half man and half horse. It is intimated by Virgil, and generally believed, that the Centaurs were a tribe of Lapithæ, who inhabited the city of Pelethronium, adjoining to Mount Pelion, and who first broke and rode upon horses. Nations to whom the sight of a man on horseback was new, believed, as did the Americans of the Spaniards, the horse and his rider made but one animal.

CENTER of gravity, that point about which all the parts of a body do, in any situation, exactly balance each other : hence if a body be suspended by the center of gravity it will remain at rest in any position :—When the center of gravity is supported the whole body is kept from falling ; and when this point is at liberty to descend, the whole body must descend, either by sliding, rolling, or tumbling down. See **MECHANICS**.

CENTRAL forces, the powers which cause a moving body to tend *towards*, or *recede* from a center of motion. The *former* is called the centripetal force, the *latter* the centrifugal force. If a stone at the end of a string be whirled round by the hand : the centripetal force is represented by the hand, and the centrifugal force by the endeavour which the stone makes to fly off in a right line.

CERBERUS, in mythology, a three-headed mastiff, who guarded the gates of hell ;—that is, the abodes of the dead. It has been conjectured, that Cerbe-

rus was the symbol of time ; and, that his three mouths denoted the past, the present and the future. If this be right, the allegory is exceedingly elegant ; since it goes on to say, that Cerberus fawned upon all who entered ; but devoured those who attempted to return.

CEREBELLUM. See *Brain*.

CEREBRUM. See *Brain*.

CEREMONIES, *Master of*, an officer instituted by James I. for the more honourable reception of ambassadors and strangers of quality, and for the regulation of all matters of etiquette in the assemblies over which they preside.

CERTIFICATE (Trial by), in the law of England, a species of trial allowed in those cases where the evidence of the person certifying is the only criterion of the point in dispute. For when the fact in question lies out of the cognizance of the Court, the judges must rely on the solemn averment or information of persons in such a station as affords them the most clear and competent knowledge of the truth. As therefore such evidence, if given to a jury, must have been conclusive, the law, to save trouble and circuitry, permits the fact to be determined upon such certificate merely.

CERVUS, the deer, abounds in cold countries, but the *Cervus tarandus*, or rein-deer, is the most valuable of all the species, as to the Laplander it is a complete substitute for the horse, the cow, the sheep and the goat : it will travel with a sledge at his back, and a person sitting in it, more than 100 miles a day : is extremely docile, and will live upon little. Its favorite food is the Lichen Island.

ticus, or Lapland moss, which it digs out from under the snow with its horns.—See Plate Nat. Hist. fig. 7.

CETE, an order of animals in the Linnæan system, including the *Monodon*, the *Balaena*, *Physeter*, and *Delphinus*. Though ranked among the *Mammalia*, they live in water like fish, but in their structure they are more nearly allied to quadrupeds than fishes.

CHAIN. See *Mensuration*.

CHALCEDONY, a genus of the semipellucid gems, variegated with different colours, disposed in the form of mists or clouds, owing to an admixture of colours imperfectly blended in the general mass, and often visible in distinct molecules.

CHALLENGE, in law, is an exception made to jurors who are returned to a person on a trial.

CHALYBEATE, in medicine, an appellation given to any liquid containing particles of iron or steel.

CHAMBERLAIN, *Lord*, of Great Britain, the sixth high officer of the crown, to whom belongs various duties on the coronation-day; and also appertains many privileges. To him belong the care of providing all things in the House of Lords during the sitting of Parliament, and the government of the Palace of Westminster. The office is hereditary, and is sometimes in the hands of a lady, who may execute it by deputy.

CHAMBERLAIN of *London*, keeps the city money, presides over the affairs of citizens and their apprentices, and presents the freedom of the city to those who have faithfully served their apprenticeships. The office lasts but one year, it is usual, however, to rechoose the same man annually, unless he shews himself unworthy the high situation.

CHAMPION, a person who undertakes a combat in the place of another: sometimes the word is used for him who fights his own cause.

CHAMPION of the King, an officer who rides armed into Westminster Hall on the coronation, while the King is at dinner, and by herald makes proclamation, "That if any man shall deny the king's title to the crown, he is there ready to defend it in single combat:" which being done, the king drinks to him, and then presents him with the cup for his fee.

CHANCELLOR, Lord High, one of the principal officers of the civil government, created without writ or patent, by the mere delivery of the king's great seal into his custody. He is a privy-counsellor by his office; and, according to lord-chancellor Ellesmere, prolocutor or speaker of the House of Lords by prescription. He appoints all the justices of peace throughout the kingdom. Persons exercising this office in former times having been ecclesiastics, and superintendents of the royal chapel, the Lord-Chancellor is still styled keeper of the king's conscience; and for the same reason is visitor, in right of the king, of all hospitals and colleges of the king's foundation; and patron of all the king's livings under the value of 20*l.* per annum in the king's books. He is the general guardian of all infants, idiots, and lunatics; has a controul over all public charities; and a jurisdiction of vast extent, as the head of the law, in his Court of Chancery; where he decides without the assistance of a jury, but from which there is an appeal to the House of Lords. He takes precedence of every lord, except the royal family, and

the archbishop of Canterbury. The title of chancellor is derived, according to sir Edward Coke, a *cancellando*, from the act of cancelling the king's patents when granted contrary to law, which is the highest power he possesses.

CHANCERY, the Court of the Lord-Chancellor; the highest seat of justice in Great-Britain, save the parliament itself. This Court is at once the strength of the law, and the bulwark of individuals against its unavoidable imperfections. As a court of common law, it can enforce proceedings in the lower Courts; and as a Court of Equity, give relief where nothing can be done before a jury, and soften the rigour of law where it falls hardly and unjustly upon individuals. In this court, the law is viewed as always intending to do right; and the *spirit* is consulted, where the *letter* would produce an improper consequence. No plaintiff, however, is to come to this Court in any case where remedy may be had at law; and that which can be tried by a jury is not triable in this Court.

CHANCES, *doctrine of*, is a subject of great importance in Life Annuities, Assurance, &c. All games depend on it, and also Lotteries, and did people understand the subject, they would less willingly embark their money in such deceitful speculations as the public lotteries. Mr. Morgan, a great mathematician, has calculated the chance that a person has of gaining the high prizes, after which all are striving, and he says that in a lottery of 25,000 tickets, of which 20 are prizes of 1,000*l.* and upwards, a person to have an equal chance of one of those tickets must purchase 740 tickets. Again supposing there are 3 prizes of 20,000*l.* and

three of 10,000*l.* and out of 25,000 tickets he has purchased 3,000 to his own share, in hopes of gaining one of each of these capital prizes, still the chances against him will be nearly 12 to one.

CHANGES, in Arithmetic, the variations or permutations of any number of things with regard to their order, position, &c. The number of changes is found by a continual multiplication of all the terms in a series of arithmetical progressionals, whose first term, and common difference is *unity*. Thus if we are seven in family, and it is required to find in how many different ways we may sit at table, the answer is $1 \times 2 \times 3 \times 4 \times 5 \times 6 \times 7 = 5040$.

If there were 8 persons, then the answer would be $1 \times 2 \times 3 \times 4 \times 5 \times 6 \times 7 \times 8 = 40320$.

CHANNEL, the deepest part of a river, strait, &c. also an arm of the sea running between an island and the main or continent, as the British Channel, Irish Channel, &c.

CHAPLAIN, an ecclesiastic in the house of princes, or persons of quality, who officiates in their chapels, &c. The king has 43 chaplains in England, and 6 in Scotland. According to a statute of Hen. VIII. the persons who may retain chaplains, together with the number each is allowed to qualify, is as follows: an archbishop, 8; a duke or bishop, 6; marquis or earl, 5; viscount, 4; baron, knight of the garter, or Lord-Chancellor, 3; a duchess, marchioness, countess, baroness, the treasurer and comptroller of the king's house, clerk of the closet, the king's secretary, dean of the chapel, almoner, and master of the Rolls, two each; chief-justice of the King's-bench, and warden of the

cinque-ports, one each. All these chaplains may purchase a licence or dispensation, and take two benefices with the cure of souls. A chaplain must be retained by letters-testimonial under hand and seal; for it is not sufficient that he serve as chaplain in the family.

CHAPTER, in the affairs of the church, an assembly for the transaction of such business as comes under its cognizance. A meeting of the members of an order of knighthood is called a chapter. Every Cathedral is under the superintendence of the dean and chapter of its canons.

CHARADE, a sort of enigma, so named from its inventor, made upon a word the two syllables of which, when separately taken, are themselves words. It consists of three parts, or three enigmas; the two first describing the syllables separately; the second alluding to the entire word. The charade can have no merit if, when its subject is explained, what has been said of it does not appear obviously applicable. In proposing a charade, one might say to a lady: "My *first* may you seldom experience! my *second* is myself; my *whole*, yourself." WO-MAN.

CHARCOAL, an artificial fuel, consisting of wood half burnt, or charred, which is performed in the following manner: the wood is cut into proper lengths, and duly arranged in piles or stacks; and these being coated over with turf, and the surface covered with plaster made of earth and charcoal dust well tempered together, are set on fire. In about two or three days, when the wood is known to be sufficiently charred, the apertures, which had been left to give vent to the flames, are closed

up ; and all access of the external air being excluded, the fire goes out of itself. Considerable skill and judgment are required of the man who attends the fire, and upon his abilities the success of the operation depends. If the whole process is rightly managed, the coals will exactly retain the figure of the pieces of wood. Some are said to have been so dexterous as to char an arrow without altering the figure of the feather.—Charcoal is used in various arts and manufactures where a clear strong fire without smoke is needful ; the humidity of the wood being here almost intirely dissipated. This article is also employed in polishing. The vapour of burning charcoal is found to be highly noxious, and is, in reality, absolute *fired air*.

In the experiments and discoveries of modern chemistry, charcoal is frequently mentioned ; and found to possess many extraordinary properties. It is incapable of putrifying, or rotting like wood, and is not liable to decay through age. New-made charcoal, by being rolled up in cloths that have contracted a disagreeable odour, effectually removes it. It takes away the bad taint from meat beginning to putrify, by being boiled along with it. It is, perhaps, the best tooth-powder known.

CHART, an hydrographical map, drawn for the use of navigators, and showing the situation of coasts, rocks, sand-banks, and sea-marks ; the course of currents ; the depth of soundings ; and the direction of regular winds : the difference, therefore, between the several projections commonly known by the separate names of maps and charts is very great ; and the general appearance,

indeed, is so striking as to distinguish them to the eyes of the most ordinary observer.

CHARTA, *Magna*, the groundwork of the laws and liberties of England. Edward the Confessor is said to have been the founder of this national blessing; Henry I. renewed it; his charter is lost; but it was revived by Henry II. who first sapped the feudal system; and by John, at the instance of the barons. Henry III. took pains to learn the extent of the liberties of England during the reign of Henry I. which was probably regarded as the genuine model; and published a new charter, the same as the *magna-charta* now extant. In the fifty-second year of his reign, after some warfare with the barons, he also granted another, called, *The charter of the forest*.

The feudal system having mouldered away, and the condition of the church being materially altered, many of the provisions of the *magna-charta* are now of little apparent moment: but the true value of this celebrated instrument is to be estimated in a philosophical point of view. The path it opened to the future career of justice is to be observed; the outlines of liberal policy which it drew, and the broad and solid basis which it laid down, are to be considered. Several regulations of this charter, however, continue to be important. Care was taken therein to protect the subject against illegal processes for debt due to the crown, and against the abuse of purveyance and pre-emption; the forfeiture of lands in cases of felony was fixed upon its present footing; it prohibited future grants of exclusive fisheries, and the crea-

tion of bridges to the injury of the neighbourhood ; established the testamentary power of the subject over part of his personal estate, and gave the rest among his wife and children ; laid down the law of dower, and prohibited the appeals of women, unless after the death of their husbands ; enjoined a uniformity of weights and measures ; protected merchant-strangers ; forbade the alienation of lands in Mortmain ; prohibited denials of justice, and delays in its administration ; fixed the court of common-pleas at Westminster, that the suitors might no longer be harrassed with following the king's person ; established annual assizes ; directed the regular awardment of inquests for life or member ; prohibited the king's inferior ministers from holding pleas of the crown, or trying any criminal charge ; regulated the time and place of holding the inferior tribunals of justice ; confirmed the privileges of all cities, boroughs, towns, and ports of the kingdom : it even extended to the lowest orders of the state, since it enacted, that the *villain*, or bondman, should not be subject to the forfeiture of his implements of tillage : and, lastly, it protected every individual of the nation in the free enjoyment of his life, his liberty, and his property, unless declared to be forfeited by the judgment of his peers, or by the law of the land : "*per legale judicium parium suorum, vel per legem terræ.*"—By the 25th of Edward I. it is ordained that this charter shall be taken as the common law ; and by the 43d of Edward III. all statutes contradicting it are declared to be void.

CHEESE, a food made of curdled milk, separated from the serum or whey. The too free use of

cheese is not considered wholesome. When new, it is very difficult of digestion; and when old, it becomes acid and hot. Shaved thin, and mixed with hot water, it will form a hard, stony mass; it must, therefore, be dangerous to drink any hot or warm liquor immediately after eating cheese. The whole milk of a dairy, produced at one or two meals, is made into a cheese, the size of which depends on the number of cows in milk. The curd is either that which separates from the skimmed milk after standing, or is more speedily produced by the application of rennet. Rennet is a mixture of aromatics and acid. The cheese differs according to these two descriptions of curd. The cream is skimmed from the milk for making butter. Cream-Cheeses, in Lincolnshire, are made by adding the cream of one meal's milk to milk that comes immediately from the cow.

· **CHELLENHAM WATERS.** See *Mineral-waters*.

· **CHEMISTRY**, the science of separation and combination, and of the properties of the ingredients of bodies. It is the glory of the eighteenth century that, during its progress, this pursuit was prosecuted with a zeal and patient toil that have multiplied facts and discoveries with a rapidity altogether unexampled in the history of human attainments. It is a subject of the greatest importance to mankind; for to chemistry, more or less scientifically pursued, numerous arts owe their birth and progress; to chemistry, the naturalist must resort for the explanation of phenomena, that, without its aid, can only be spoken of by conjecture, and on a true knowledge of which our happiness, as thinking beings, eminently depends. The

science of chemistry consists in the knowledge of the simple substances that enter into the composition of bodies, of the manner in which these substances combine, and of the properties of the compounds which they form. Simple substances are those which have never yet been decomposed, and therefore answer to what the ancients called *elements*: but the moderns, warned by the rashness of their predecessors, are cautious of applying that term, because it is very possible, that the bodies we reckon simple may be real compounds; and all that is known is,—they have not yet been decomposed. Were we acquainted with all the elements of bodies, and with all the combinations of which those elements are capable, the science of chemistry would be as perfect as possible; but this is very far from being the case. All the bodies that are at present reckoned simple, because they have never been decomposed, may be reduced into six classes. 1. Oxygen, 2. Simple combustibles, 3. Metals, 4. Earths, 5. Caloric, 6. Light. Simple combustibles are bodies capable of combustion, that have not yet been decomposed: these are, sulphur, phosphorus, carbon, hydrogen, azot, and all the metals. OXYGEN, and the other articles, will be explained in the order of the alphabet.

Under the article ATTRACTION, is mentioned chemical attraction; or the attraction of combination. This power, which disposes the particles of different bodies to unite, is called by Newton, *attraction*; but by many of the modern chemists, *affinity*. Between all substances capable of uniting, there is said to be an *affinity*; between those substances, on the contrary, which do not unite, there is said to

be no affinity. Thus, there is no affinity between water and oil; and there is a greater affinity between water and spirit of wine than between water and common salt; inasmuch as a combination of the two latter ingredients is destroyed, if the water be permitted to combine with spirit of wine; in which case the salt sinks to the bottom, and the water is no longer saline to the taste.

Chemists once flattered themselves with the hope of a richer reward than commonly belongs to the labours of science. They believed that they should be able to make gold. It had been customary to consider all bodies as composed of certain permanent and unchangeable parts, called elements; and the end of chemistry as the power of resolving bodies into these elements, and recombining them again by a proper mixture of the elements when so separated. Upon this supposition the alchemists went; who, conceiving that all bodies were composed of salt, sulphur, and mercury, endeavoured to find out the proportions in which they existed in gold, and then to form that metal by combining them in a similar manner. Had they taken care to ascertain the real existence of these elements, and, by mixing them together, composed any one metal whatever, though but a grain of lead, their pretensions would have been rational and well founded; but as they never did this, their want of success is not surprising.

CHEMICAL apparatus: the object of chemistry being to ascertain the ingredients of which substances are composed, to examine the nature of those ingredients, and the properties resulting from their combination or union, it is necessary that

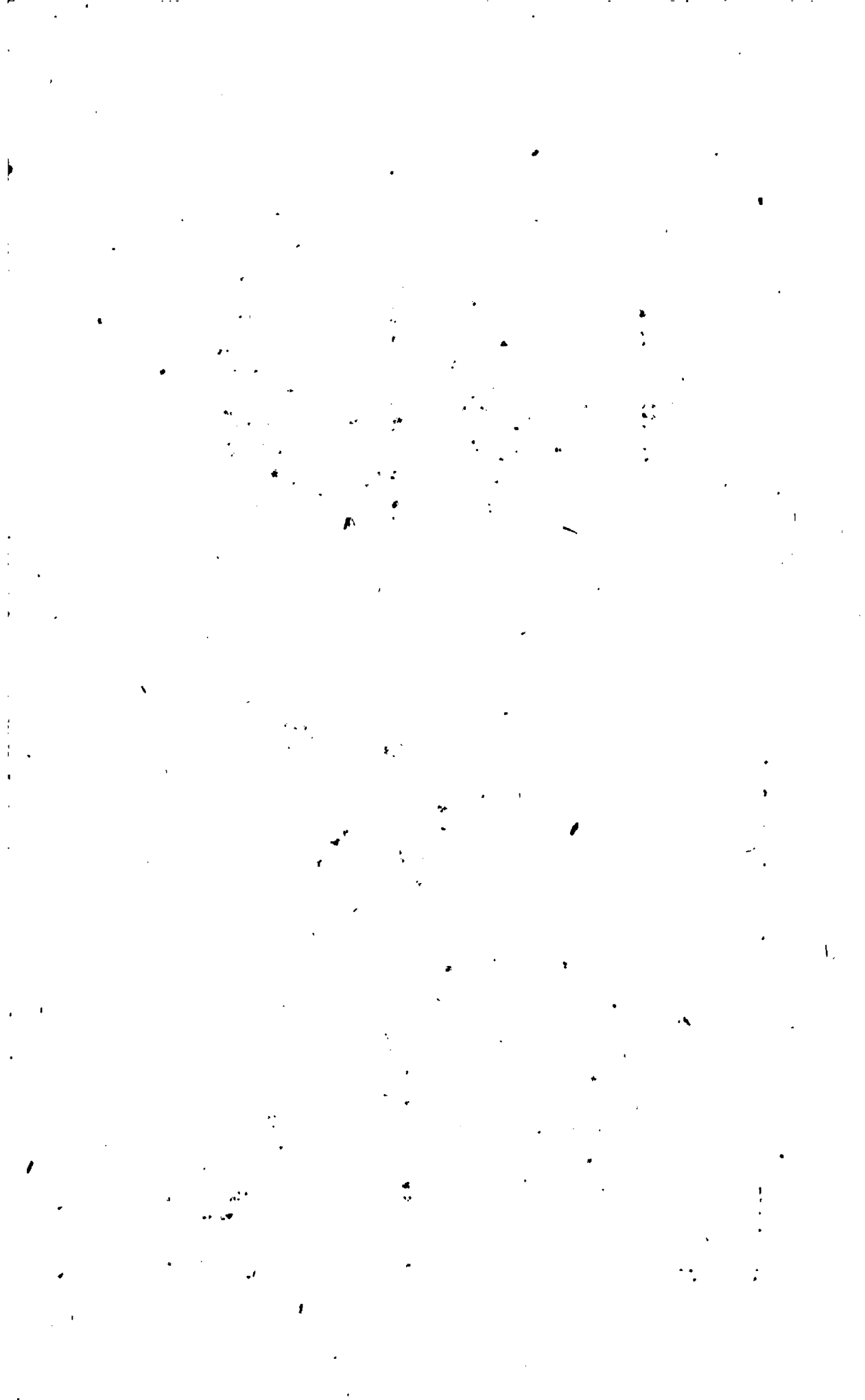
there should be divers instruments for the purpose. For the mechanical division of bodies it is requisite the chemist should have hammers, knives, files, and rasps, for breaking, cutting, rasping, filing and shaving: he should have mortars for pounding; a stone and muller for levigating: a pair of rollers for laminating metals, a forge for many of the purposes in which the blast-heat of a small fire is required; LAMPS, FURNACES, &c. descriptions of which will be found under the proper heads. We shall in this article describe some of the familiar apparatus necessary to a young chemist, and to which we shall have occasion to refer in other parts of our work. The very first thing to be got is the apparatus for obtaining gases. Plate I, Chemistry, fig. 1. is a tub or trough A Z full of water, with a shelf, K K K, in it. B, G, F are glass jars or receivers, inverted with their mouths downwards. We shall point out its use by the example of Oxygen gas. C is a glass bottle into which are put some red-lead or manganese, and a small quantity of dilute sulphuric acid. D is a glass tube generally fitted by grinding to the neck of the bottle, and curved so as to enter conveniently below the shelf and communicating with one of the jars or receivers B, G, F. E is a glass retort, such as is shewn figure 5, which may be applied to the same purpose. If the bottom of the bottle C be heated by means of a wax-taper or common candle, the oxygen gas will rise in bubbles, and fill the receiver, from which it drives out the water.

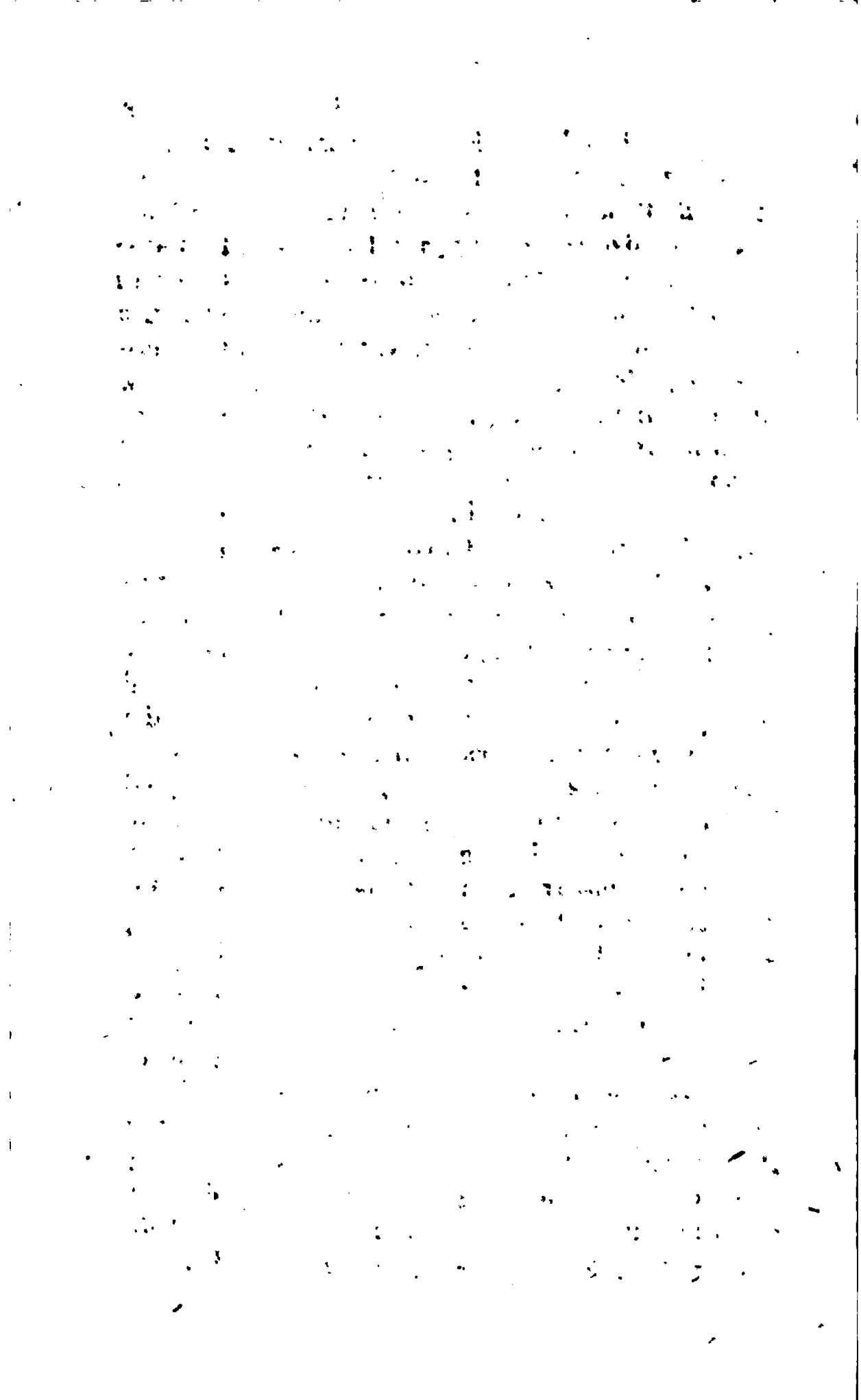
Fig. 2. Represents an elegant chemical apparatus of the same nature, used by Mr. Davy, the professor of chemistry, at the Royal Institution.

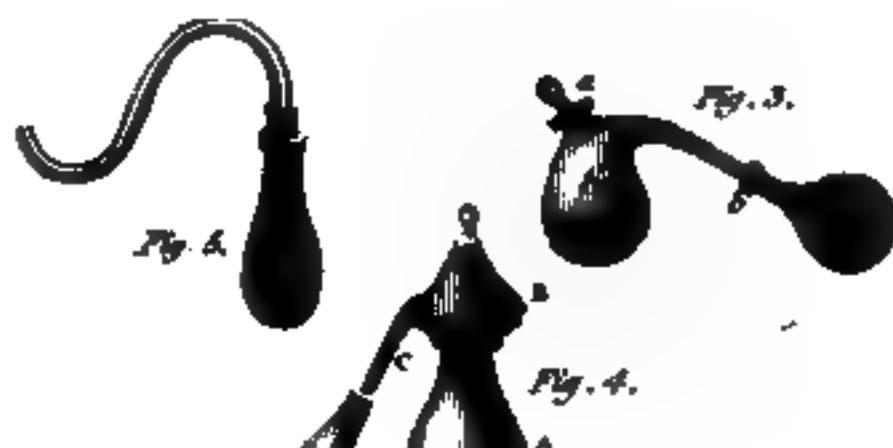
A, is a japanned tin vessel, filled within two or three inches of the top with water. Just below the surface of the water is fixed a shelf, having several holes bored through it, to which small funnels are attached underneath. The glass receiver B, intended to receive the gas, is filled with water, and being inverted with its mouth under water, it is raised up gently, and placed upon the shelf over one of the holes, where it will remain full of water, which is kept up by the pressure of the atmosphere, in the same way as the mercury is retained in the tube of a barometer.

The materials from which the gas is to be disengaged, are put into the retort G, which is put through and suspended in one of the rings of the lamp furnace. A E is an improved Argand's lamp, having two concentric wicks, placed on a shelf which is moveable up and down to bring the lamp to a convenient distance from the retort. The lamp is to be lighted, and as soon as the substances in the retort act upon each other, the gas will begin to be disengaged, and will ascend through the whole of the shelf into the vessel B, and displace or force down the water with which it had been filled. When the water is displaced, the receiver is full of gas, which may be preserved in it, by keeping its mouth always under water in the cistern.

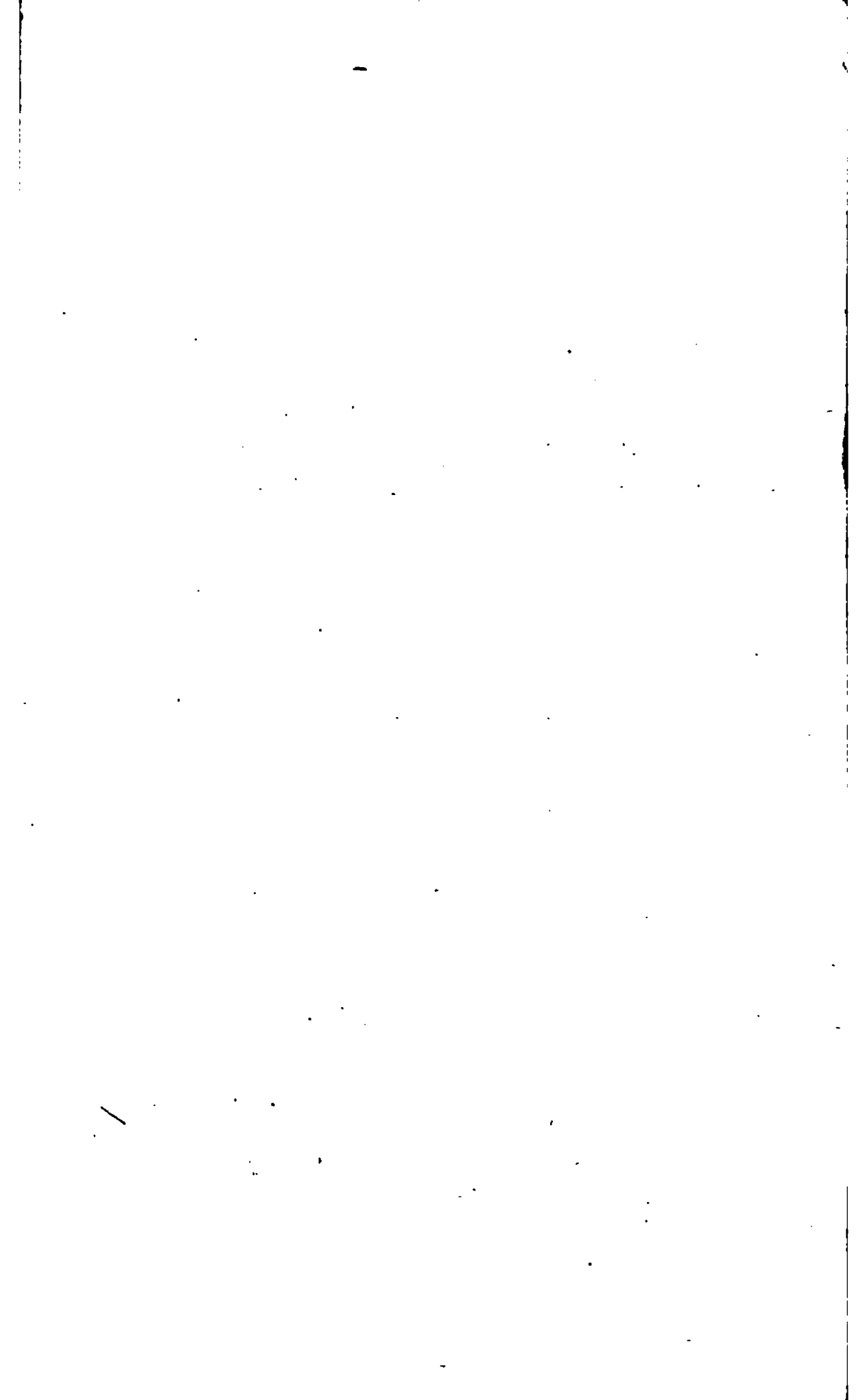
The gas so obtained may be transferred from the vessel B, to any other, in the following manner: fill the vessel into which the gas is to be transferred, with the fluid in the trough, and place it on the shelf, over one of the holes. Then take the vessel B, and keeping its mouth still under the





Chemical Apparatus.

Engraved on copper.



fluid, bring it under the hole above which the vessel to be filled is placed ; then by depressing its bottom, and elevating its mouth so as to bring it to an horizontal position, the gas in it will escape and rise up through the hole, on which the other has been placed, and will fill it by displacing the fluid.

When the gas to be procured is absorbed by water, as carbonic acid gas, quicksilver is used instead of water, to fill the trough, and a much smaller vessel than A, made of stone or wood, is used. See fig. 6. Pl. II.

A small glass vessel, capable of containing an ounce measure, is used for measuring gases ; if this phial be successively filled, and emptied under a larger jar, we may thereby throw into that jar whatever quantity of gases, or any mixture of them we please.

Adjoining the receiver B, and on the shelf, is a strong glass tube, for receiving a mixture of gases, intended to be exploded by means of the electrical sparks. Near the upper end, which is closed, two pieces of brass wire pass in the tube ; they are cemented in so as to make the holes air-tight, and they nearly touch each other within the tube. If the interval between the two wires be made a part of the electric circuit, by putting chains, connected with a Leyden phial, to the hooked ends of the wires, the electric spark will pass through the interrupted space between the two wires and explode the gases.

Fig. 3. Represents a retort used in distillation. It is a vessel either of glass, or of baked earth, for containing the liquor to be distilled. When it has a small neck c, with a stopple fixed to it, for in-

producing the materials through, it is called a tabulated retort. B is the receiver for condensing the vapour which is raised, and into which the neck of the retort is inserted. The joining b, is made air-tight by some substance, such as paste, applied to it, called in chemistry luting.

When great heat is employed, earthen retorts are used, and they are placed on a fire. When a less heat is wanted, glass retorts are used, which are suspended over a lamp. The receiver B is placed on some stand, which will keep it steady.

Fig. 4. A, is a chemical vessel, called a matrass, used for distillation also, having a vessel B called an alembic, fitted to the head. The liquid, raised by heat into the state of vapour, is condensed in the alembic, and falls into a groove all round its inside, whence it runs out by the spout C into the receiver D.

Fig. 5. Is a phial with a bent glass tube, fitted into it for disengaging gases in the pneumatic apparatus.

Fig. 6. Plate II. Chemical Apparatus, is an apparatus contrived to collect such gas as cannot be received over water. The box contains mercury, and is used in every respect like the apparatus fig. 1.

Fig. 7. Exhibits the method of sublimation. Put some pieces of sulphur into the vessel A to which the receiver B is fitted and accurately luted round. A is put on a vessel filled with sand called a sand bath, which is to be heated by the furnace C. The sulphur melts, a thick white smoke arises, which is deposited in B in the form of powder. Hence it is called flowers of sulphur. The earthy

matter is left behind, and the sublimed sulphur is pure.

Fig. 8. is a crucible. Crucibles are generally made of baked clay, or a mixture of clay, and black lead in powder, which renders them capable of sustaining an intense heat. When used for melting substances, they have generally covers adapted to them, as is shewn in the figure.

Fig. 9. is called a philosophical candle, which is exhibited by setting fire to hydrogen gas. See HYDROGEN. A B is a glass jar containing iron filings; *a* is an additional neck, with a stopper, by which a fresh supply of iron filings and sulphuric acid may be readily introduced; *b x* is a piece of tobacco-pipe fixed into the cork or stopper *b* of the jar A B.

Fig. 10. is the representation of the combustion of iron in oxygen gas. A is the iron wire supposed to be in a state of inflammation, B C is a glass jar containing oxygen gas placed in a vessel containing water. This experiment was contrived by Dr. Ingenhouz.

Fig. 11. represents a blow-pipe eight or nine inches long. It is made of brass or silver, the mouth piece A, should be of ivory, the hollow globe B, is contrived to condense the vapours coming from the breath; the opening C, through which the wind is applied to the flame, must be as small as the finest wire.

Fig. 12. *Decomposition of water.*—E F is a tube of common glass, made very strong and thick, about an inch in diameter. C F E D is a furnace of iron, containing lighted charcoal; A is a glass retort, containing water, and resting on a small

surface *V K*. To the lower extremity of the glass tube, a worm *S S* is applied, connected with the flask *H*, which has two necks, or orifices. To this flask, a glass tube *K k* is adapted, in order to convey the gas formed, to any proper vessel for receiving it. When the apparatus is thus arranged introduce into the glass tube *E F*, a quantity of iron filings, and fill the retort *A*, with water. (The fire being then lighted both under the tube and under the retort, the glass tube will become red hot, and the water in *A* will boil and rise through the iron filings in a state of vapour. The iron absorbs the oxygen of the water, and becomes oxidized. The hydrogen of the water passes through the worm *S S* into *H*, and from thence rises in the state of gas, into the tube *K k*, to which a bladder, or other receiver, may be applied, in order to obtain it. When the apparatus is cooled, the iron filings will be found to weigh much heavier than when first put in, from the quantity of oxygen they have absorbed; and in this state they exhibit a true oxide of iron. See the article LABORATORY, in which will be found an account of many of the substances used in chemical experiments.

CHess, a game played by two persons sitting vis-a-vis, and having between them a square board, containing 64 rectangular chequers, alternate white and black: each player has the white corner square at his right hand. The pieces are as follows, for each party. A queen, which is always placed on her own colour: thus, the white queen is on a white square, the fourth from the corner, and the black queen on the black square facing the white queen. Their respective kings are then placed by



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the sides of the queens, so that each couple occupy the two centre squares on the line nearest the players. Two bishops are then placed, one on the side of the king, the other on the side of the queen, on squares of different colours. Bishops are generally distinguished by a kind of mitre on their tops: at the sides of the bishops are placed the two knights, also on different coloured squares: these are usually distinguished by horses heads, or by having a piece obliquely taken off from their flat round bonnets. The exterior pieces are called castles or rooks, and are commonly made to resemble turrets; or may be only pawns of a larger size. The pawns, eight in number, are ranged so as to occupy all the squares on the second line, immediately in front of the line of pieces. Pawns are generally pieces of turned wood, of a neat pattern, and with spherical summits. This description of one party will answer for both; observing that the players are designated according to the colour of their pieces. Directions for playing must be had from larger works, but the best mode of learning will be from observation and practice.

CHEVAL-DE-FRISE, spikes of wood, armed or pointed with iron, and six feet long, fixed in a strong beam of wood, somewhat in the manner of the well-known piece of household furniture, a cat; and used as a fence against cavalry, in military operations.

CHILBLAIN, in a mild state, is a moderately red tumour occasioning heat and itching. In a more severe state, the tumour is larger, redder, and approaching to a dark blue or black colour. In the third degree, blisters arise in the tumours, and they change to sores. The worst cases of chilblains end

in mortification. Chilblains are occasioned by suddenly warming a cold part, or suddenly cooling a heated part: hence the parts of the body most subject to the complaint are the toes, fingers, ears, &c. Chilblains in the mild stage may usually be cured by well rubbing the parts with POMADE DIVINE, which see: or by immersing the hands or feet in ice-cold water, or rubbing them with snow or pounded ice two or three times a day: after each application the part is to be dried and covered with a leathern sock.

CHILI, a country of South America, situated between the 25th and 45th degrees of south latitude, and between 65 and 85 degrees west longitude. It has Peru on the north, La Plata on the east, Patagonia on the south, and the Pacific Ocean on the west. The air and soil on the west are much better than on the east; for when the east side of the Andes is covered with gross vapours, the heavens are bright and clear on the west. The east side is a barren desert, but the west produces various kinds of corn, fruits and flowers in the greatest plenty.

CHILIAGON, is a regular plane figure of 1000 sides and angles.

CHILTERN-HUNDREDS, certain hundreds into which many of the counties of England were divided by Alfred, and which still retain their peculiar courts. The chiltern hundreds have been annexed to the crown. The *stewards* of their courts are appointed by the chancellor of the exchequer, with a salary of 20s. per annum. It being an established rule that a member of parliament receiving a place under the crown cannot sit, unless re-elected, the acceptance

of a stewardship of the chiltern hundreds is a formal manner of resigning a seat. *Chiltern* is from the Saxon word *chilt*, and generally applied to the hundreds that lie in the hilly part of a county.

CHIMES, of a clock, a kind of periodical music, produced at certain hours by a particular apparatus added to the clock. The barrel which produces the chimes must be as long in turning round as the tune takes in playing. It may be made up of certain bars, with a number of holes punched in them, to fix the pins that are to draw each hammer: by this means the tune may be changed, without changing the barrel. Then the pins which draw the hammers, must hang down from the bar, some more, some less, and some must stand upright in the bar, to play the time of the tune rightly.

CHIMNEY-sweeping; smoke in its passage through a chimney deposits a considerable quantity of soot, which is apt to take fire, and also to fall back into the room. It is therefore necessary frequently to have the flues cleansed and the soot removed from them. The usual method in this country is by means of children, who are from a very early stage forced up chimnies, sometimes at the hazard of their lives, always at the risque of their health. The evils of this unwholesome occupation have from time to time engaged the attention of the humane, and some years since a premium was offered for the best mechanical invention that should supersede the necessity of climbing boys. There were many candidates for the prize, which was after repeated examinations and experiments adjudged to Mr. George Smart, the patentee of a method of making hollow masts. As his method,

though by no means perfect in the practice, has been a good deal used in and about the metropolis, we shall give an account of its mode of operation. The principal parts of the machine are a brush, some rods or hollow tubes, that fasten into each other, by means of brass sockets, and a cord connecting the whole together. The method of using the machine is this; having ascertained, by looking up the chimney, what is the direction of the flue, a cloth is then to be fixed before the fire-place, with the horizontal bar, and the sides to be closed with two upright bars. The brush is introduced through the opening of the cloth, which opening is then to be buttoned, and one of the rods is to be passed up the cord into the socket on the lower end of the rod which supports the brush; the other rods are in like manner to be brought up, one by one in succession, till the brush is raised somewhat above the top of the chimney, observing to keep the cord constantly tight, and when those rods which have a screw in the socket are brought up, they are to be placed on the purchase; the cord is to be put round the pulley and drawn very tight, and screwed down, by which all the rods above will be firmly connected together, and the whole may be regarded as one long flexible rod. In pulling the machine down, the edges of the brush striking against the top of the chimney, will cause it to expand, and there being a spring to prevent its contracting again, it will bring down the soot with it. In drawing down the machine, the person should grasp with his left hand the rod immediately above that which he is separating with his right hand to prevent the upper ones from sliding down too soon.

The rods, as they are brought down, are to be laid carefully; one by one, in as small a compass as possible, and arranged like a bundle of sticks.

This machine has been found of great utility in extinguishing fires in chimnies, for that purpose a thick coarse cloth well drenched in water, is to be tied over the brush, and then forced up the chimney in the manner directed. The whole invention is very honourable to Mr. Smart's talents; but there still requires an addition to the machine, which will not be the part of the chimney sweeper's scraper.

CHINA, an extensive empire in Asia, bounded on the north by Tartary, from which it is separated by a great wall 500 leagues in length; on the east by the Yellow Sea, and the China Sea; on the south by the latter sea, and the kingdoms of Tonquin, Laos, and Burmah; and on the west by Thibet. It lies between 20° and 41° north latitude and between 100° and 125° E. longitude, being 2000 miles from north to south, and 1500 from east to west, and occupying 1,297,299 square miles. This country contains 15 provinces, exclusive of that of Lyan-song, which is situated without the great wall. These provinces contain 4,402 walled cities divided into classes, the civil and the military: the civil class contains 2,045 and the military 2,357. This country probably owes its name to a Chinese word, signifying middle, from a notion the natives had that their country lay in the middle of the world. Its chief rivers and waters are the Yamour and the Argun, which are the boundary between the Russian and Chinese Tartary; the Whambo, or the Yellow river, the Kiam or the Blue river, and the Tay. Common water in China is very indifferent;

and in some places it is boiled to make it fit for use. The chief of its bays are those of Nankin and Canton. Its canals however are sufficient to entitle the ancient Chinese to the character of a most wise and industrious people. The commodiousness and length of these are incredible. The chief of them are lined with hewn stone on the sides, and they are so deep, that they carry large vessels, and sometimes they extend 1,000 miles in length. Those vessels are fitted up for all the conveniences of life, and it has been thought by some, that in China the water contains as many inhabitants as the land. They are furnished with stone quays, and sometimes with bridges of an amazing construction; the navigation is slow, and the vessels are sometimes drawn by men. No precautions are wanting, that could be formed by art or perseverance, for the safety of the passengers, in case a canal is crossed by a rapid river, or exposed to torrents from the mountains. These canals, and the variety that is seen upon their borders, render China delightful in a very high degree as well as fertile, in places that are not so by nature. According to the statement of the population of China delivered to Lord Macartney at his request by Chowta-Zhin, a Chinese mandarin, and which was founded on documents taken from one of the public offices in Peking, the number of inhabitants in China is no less than 393,000,000. This estimate Sir George Staunton defends, and gives a variety of reasons from circumstances almost peculiar to China, to account for the great population, observing in conclusion, that from this statement it appears that China contains upon an average about one third more inhabitants

than are found upon an equal quantity of land in the most populous country in Europe. This country runs through so many climates, that the air is very different in the northern and southern provinces. The south of China, which lies under the tropic of Cancer, is excessively hot, and has its annual periodical rains as other countries under the same parallel. The middle of China enjoys a temperate climate and a serene atmosphere. The north is cold, and subject to the same inclemencies of weather, to which other northern countries are. The complexion of the Chinese is a sort of tawny, and they have large foreheads, small eyes, long beards, long ears, and black hair, and those are thought to be most handsome, that are most bulky. The women affect a great deal of modesty, and are remarkable for their little feet. The men endeavour to make as pompous an appearance as possible when they go abroad, and yet their houses are mean and low, consisting only of a ground floor. The government is absolute, and the emperor has the privilege of naming his successor; but the chief mandarin has permission to tell him of his faults. He looks upon his subjects as his children, and professes to govern them with parental affection. The Chinese empire is very ancient. It is generally allowed to have continued nearly 4,000 years. The annual revenues of the crown, according to Sir George Staunton, are about 60,000,000*l.* sterling, and the army in the pay of China, including Tartars, amounts to 1,000,000 infantry and 800,000 cavalry.

CHINESE Language, is an object of much curiosity to literary men. The late lamented and il-

Austrian president of the Asiatic Society gives the following account of the Chinese characters from Li Yang Ping. The earliest of them were nothing more than the outlines of visible objects, earthly and celestial; but as things merely intellectual could not be expressed by those figures, the grammarians of China contrived to represent the various operations of the mind by metaphors drawn from the productions of nature. Thus the idea of rotundity and roughness, of motion and rest, were conveyed to the eye by signs representing a mountain, the sky, a river, and the earth. The figures of the sun, the moon, and the stars differently combined stood for smoothness and splendour, for any thing artfully wrought or woven with delicate workmanship. Extension, growth, increase, and many other qualities were painted in characters taken from the clouds, from the firmament, and from the vegetable part of the creation. The different ways of moving, agility, and slowness, idleness, and diligence, were expressed by various insects, birds, fishes and quadrupeds. In this manner passions and sentiments were traced by the pencil, and ideas not subject to any sense were exhibited to the sight, until by degrees new combinations were invented, new expressions added, the characters deviated imperceptibly from their primitive shape, and the Chinese Language became not only clear and forcible but rich and elegant in the highest degree.

CHINESE RELIGION. According to the books of the Chinese, the Supreme Being is the principle of every thing that exists, and the father of all living; eternal, immovable, and independent; his power

knows no bounds ; his sight equally comprehends the past, present, and the future, penetrating even into the inmost recesses of the heart. In ancient times, the Chinese sacrificed to the *Tao* in the open fields, or upon some consecrated mountain ; and solemn sacrifices seem to have constituted the rites, and piety and virtue the lessons, of this primitive religion. The origin of the present popular doctrines of this extraordinary empire, forms a well-connected, and we may believe, correct history. About six centuries before the Christian era, was born a philosopher named *Ki-un*, or Confucius, and surnamed the *Ta-o-tse*, who after living to an advanced age, left a book containing 5,000 sentences for the use of his scholars. The opinions and temper of this luminary appear to have resembled those of the placid and cheerful, but unapprehended, Epicurus. He advised the banishment of all vehement desires and perturbing passions ; praised the man whose innocent life permitted him to glide gently down the stream of life, unruffled with anxiety and care ; and taught his followers to avoid, as much as possible, all useless retrospection of the past, and as useless inquiry about the future. It was found, however, by his disciples, that all their endeavours to obtain a tranquillity of mind were in vain, so long as the thoughts of death intervened : that is to say, the thoughts of death rendered their minds unfit to receive the philosophy of *Ki-un*. They listened to those who promised to remove this evil, by producing a drink that should confer immortality upon mankind ; and, as if to discourage all future teachers, on the basis laid by *Ki-un*, arose a superstructure laden with the fallacies

and the crimes of superstition. To discover the elixir of life, they devoted their time to chemistry; and, amid the processes of that science, lost time themselves in the reveries and impostures of magic. The name of Ki-un was dishonoured by men who invoked spirits, who pretended to foretell future events, and who made lying promises of perpetual youth. His form of public worship was profaned in temples consecrated to fantastic powers, where spells and images were sold to gratify the avarice of priests, at the expense of truth and the peace of human life. Unfortunately, several series of emperors became the dupes of these artifices. They did not merely forbear to oppose them by the arm of authority, a line of conduct that had testified their wisdom, but became the most infatuated of devotees; and in return, when dead, were revered as Gods. The chief priest was made grand mandarin of the empire; an eminence that is still enjoyed by his successors; though, through the imprudence of one of these dignitaries, a rival was engendered that has long drawn aside the larger half of the votaries. He promised the brother of the reigning emperor an introduction to the conversation of spirits: the credulous prince had heard of a mighty one, called Fo, whose abode, or rather whose worship, was in India, whither he prevailed on his brother to send ambassadors. Whatever had been the ancient celebrity of Fo, it appears that the name was now on the point of falling into oblivion; since the envoys could only find two of his worshippers, whom, with their images and sacred writings, they carried in solemn procession to the imperial city. Such is the story of the introduc-

tion of the religion of Fo, which happened about the 65th year of the Christian era: but its enemies may have traced its origin; more solid grounds might exist for the imperial embassy; and it might be at least as valuable as that which it in some measure supplanted. In its native country, it appears to have been a branch of the doctrines common to the banks of the Indus. It teaches the metempsychosis, or transmigration of souls; forbids, in consequence, the slaughter of living creatures, and enjoins honesty, purity, truth, sobriety, and acts of charity.

CHINESE Wheel, is an engine employed in the province of Kiang-see, and probably through the whole empire, for raising water from rivers to irrigate plantations of sugar canes; on a sandy soil, considerably elevated above the level of the river. According to sir George Staunton, who says it is ingenious in its contrivance, cheap in its materials, easy in its operation, and effectual to its purpose, the wheel is from 20 to 40 feet in diameter; according to the height of the bank and elevation to which the water is to be raised. Such a wheel is capable of sustaining with ease 20 tubes or spouts, of the length of 4 feet, and diameter two inches in the clear. The contents of such a tube would be equal to six-teenths of a gallon and a periphery of 20 tubes 12 gallons. A stream of a moderate velocity would be sufficient to turn the wheel at the rate of four revolutions in one minute, by which would be lifted 48 gallons of water in that short period; in one hour, 2,880 gallons: and 69,120 gallons or upwards of 300 tons of water in a day.

CHIVALRY, in the history of Europe, a military

institution, the origin, object, and character of which, are described, not to say painted, in the following words of Gibbon: "Between the age of Charlemagne and that of the Crusades [A. D. 800—1096], a revolution had taken place among the Spaniards, Normans, and French, which was gradually extended to the rest of Europe. The service of the infantry was degraded to the plebeians; the cavalry formed the strength of the armies; and the honourable name of *miles*, or *soldier*, was confined to the gentlemen, who served on horseback and were invested with the character of knighthood. The dukes and counts, who had usurped the rights of sovereignty, divided the provinces among their faithful barons; the barons distributed among their vassals the fiefs or benefices of their jurisdiction; and these military tenants, the peers of each other and of their lord, composed the noble or equestrian order, which disdained to conceive the peasant or burgher as of the same species with themselves. The dignity of their birth was preserved by pure and equal alliances; their sons alone who could produce four quarters, or lines of ancestry, without spot or reproach, might legally pretend to the honour of knighthood; but a valiant plebeian was sometimes enriched, and ennobled by the sword, and became the father of a new race. A single knight could impart, according to his judgment, the character which he received; and the warlike sovereigns of Europe derived more glory from this personal distinction than from the lustre of their diadem. This ceremony was in its origin simple and profane: the candidate, after some previous trial, was invested with his sword and spurs; and

his cheek, or shoulder, was touched with a slight blow, as an emblem of the last affront which it was lawful for him to endure. But superstition mingled in every public and private action of life : in the holy wars it sanctified the profession of arms ; and the order of chivalry was assimilated in its rights and privileges to the sacred order of priesthood. The bath and the white garment of the novice were an indecent copy of the regeneration of baptism ; his sword, which he offered on the altar, was blessed by the ministers of religion ; his solemn reception was preceded by fasts and vigils ; and he was created a knight in the name of God, of St. George, and of St. Michael the Archangel. He swore to accomplish the duties of his profession ; and education, example, and the public opinion, were the inviolable guardians of his oath. As the champion of God and the ladies, he devoted himself to speak the truth ; to maintain the right ; to protect the distressed ; to practise *courtesy*, a virtue less familiar to the infidels ; to despise the allurements of ease and safety ; and to vindicate in every perilous adventure the honour of his character. The abuse of the same spirit provoked the illiterate knight to disdain the arts of luxury and peace ; to esteem himself the sole judge and avenger of his own injuries ; and proudly to neglect the laws of civil society and military discipline. Yet the benefits of this institution, to refine the temper of barbarians, and to infuse some principles of faith, justice, and humanity, were strongly felt, and have been often observed. The asperity of national prejudice was softened ; and the community of religion and arms spread a similar colour and generous emulation.

over the face of Christendom. Abroad in enterprise and pilgrimage, at home in martial exercise, the warriors of every country were perpetually associated: and impartial taste must prefer a gothic tournament to the olympic games of classic antiquity. Instead of the naked spectacles which corrupted the manners of the Greeks, and banished from the stadium the virgins and matrons, the pompous decoration of the lists was crowned with the presence of chaste and high-born beauty, from whose hands the conqueror received the prize of his dexterity and courage."

CHONDROPTERIGIOUS, a term applied by the Linnean system to an order of fishes with cartilaginous gills. Dr. Shaw, and other naturalists, have united the *branchiostegi* and *chondropterygii* under the general title of *cartilaginei*. Linnæus separated the cartilaginous from the other fishes, and placed them in the class *Amphibia*, where they constituted the order *Nantes*.

This distribution was made under the supposition of the cartilaginous fishes being furnished both with lungs and gills. The supposed lungs, however, have been since ascertained by naturalists to be only a modification of the gills, and it, therefore, now appears that this cartilaginous tribe consists in reality of fishes, differing principally, if not entirely, from other fishes, in having a cartilaginous skeleton.

CHORD, in music, the union of two or more sounds uttered at the same time, and forming together an entire harmony.

CHORD of an arch is the right line joining the extremes of that arch.

CHORDS. See **INSTRUMENTS.**

CHOROGRAPHY, the art of delineating or describing some particular country or province : it differs from geography as a description of a particular country differs from that of the whole earth; and from topography as the description of a country from that of a town or district.

CHOROIDES, denotes the coat of the eye immediately under the sclerotica.

CHORUS, in dramatic poetry, one or more persons present on the stage during the representation, uttering an occasional commentary on the piece, preparing the audience for events that are to follow, or explaining circumstances that cannot be distinctly represented. Several examples may be referred to by the English reader, in the plays of Shakspeare. In tragedy, the chorus was at first the sole performer; at present it is wholly discontinued on the stage. Mason's *Elfrida* is celebrated for its chorusses.

CHORUS, in music, the part in which several persons join the singer.

CHRISTIANITY, the religion of Christians, who derive their name from the founder **CHRIST**, were first so designated at Antioch. The foundation of a Christian's faith and practice, his ultimate, and, in truth, only appeal, must be to the facts, the doctrines, and the precepts of the Scriptures, especially to those of the New Testament. Other formularies, or confessions of faith, are not to be regarded in comparison with the Scriptures. The reader will find in the New Testament a detail of instructions given, of wonders performed, and of future events revealed. He will be struck with a very particular

account of the sufferings, death, resurrection and ascension of Jesus the founder. The history containing those things appears to be fairly written, and to carry with it as substantial proofs of its authenticity as any history that has gained credit in the world. Is the young Christian asked why he believes in the antiquity of the writings of the New Testament, he may reply, for the same reason that he believes the works of Virgil, Horace and Sallust, to be of ancient origin. Is he asked why he believes that the several books were written by the persons whose names they bear ; he will say, for the same reason that he believes the Georgics of Virgil and the Paradise Lost were written by Virgil and Milton. In reasoning upon the truth of Christianity, he may appeal to its internal evidence, and combining the doctrine, and precepts of the system, infer from them the validity of the system itself. The early triumphs of this religion furnish another powerful argument in its support, especially if it be remembered that in the estimation of the world, it was neither honourable, profitable nor popular. Under every disadvantage, and struggling under the most terrible persecutions, it flourished, and has maintained its ground for nearly two thousand years. Another argument for the truth of the Christian religion arises from the completion of prophecies of which some preceded Jesus, and were accomplished by him, and others were uttered by him and came to pass during his life ; such were the treachery of Judas, and the cowardice and meanness of Peter ; or within a few years after his crucifixion, of this kind was the destruction of Jerusalem. The character of CHRIST and the miracles

which he wrought are the evidences of the divinity of his mission. On these grounds, if the question be put, why are you a Christian? the answer may be, "Not because I was born in a Christian country and educated in Christian principles: not because I find the illustrious Bacon, Boyle, Locke, Clarke and Newton among the professors and defenders of Christianity: not merely because the system itself is so admirably calculated to amend and exalt human nature, but because the evidence accompanying the gospel has convinced me of its truth." In other words, I am a Christian, because the Christian religion carries with it internal marks of its truth: because, not only without the aid but in opposition to the civil authority; in opposition to the art, the argument and violence of its enemies, it made its way and gained an establishment in the world, because it exhibits the accomplishment of some prophecies, and presents others which have been since fulfilled; and because its author displayed an example and performed works which bespeak not merely a superior but a divine character. Upon these several facts I ground my belief as a Christian, and till the evidence on which they rest can be invalidated by counter evidence I must retain my principles and profession.

CHROMATICS, that part of optics which explains the several properties of the colours of light, and of natural bodies. On this very intricate subject no theory has been yet advanced against which formidable and perhaps unanswerable objections may not be brought. The Newtonian doctrine authorizes the following aphorisms: "1. All the colours in nature proceed from the rays of light. 2. There are seven

primary colours; viz. red, orange, yellow, green, blue, indigo, and violet. 3. Every ray of light may be separated into seven primary colours. 4. The rays of light, in passing through the same medium, have different degrees of refrangibility. 5. The difference in the colours of light arises from its different refrangibility: that which is the least refrangible, producing red; and that which is the most refrangible, violet. 6. By compounding any two of the primary colours; as red and yellow, or yellow and blue, the intermediate colours, as orange, or green, may be produced. 7. The colours of bodies arise from their dispositions to reflect one sort of rays, and to absorb the other; those that reflect the least refrangible rays appearing red; and those that reflect the most refrangible, violet. 8. Such bodies, as reflect two or more sorts of rays, appear of various colours. 9. The whiteness of bodies arises from their disposition to reflect all the rays of light promiscuously. 10. The blackness of bodies proceeds from their incapacity to reflect any of the rays of light."

CHRONOLOGY treats of time, the method of measuring its parts, and of adapting these to past transactions for the illustrating of history. This important branch of knowledge is founded upon astronomy. By laborious calculations the date of remote events is attempted to be ascertained; but with what degree of certainty the disputes among chronologers may enable the world to guess. We are told that, "They count 132 contrary opinions concerning the year in which the Messiah appeared upon earth: among all these authors, however, there are none that reckon more than 7000 years, nor less than

5700; but even this difference is enormous." The admirable divisions of time into years, months, days, hours, minutes, and seconds, have given a general precision to the notions of mankind; taught us what regular history is; and enabled us to transmit to posterity a legacy that may remove, rather than multiply, its errors.

A day, in common discourse, usually means that period of time during which the sun remains above the horizon; but, in a philosophical sense, it denotes the time of a complete revolution of the earth about its axis. The beginning of the day is variously reckoned by different nations: some reckoned it from sun-set, some from sun-rise, and in most European nations the day is computed from midnight, but modern astronomers count the day from noon, the time at which the sun is on the meridian. The Jews and Romans divided their day into four watches; the first commenced at six in the morning, the second at nine, the third at twelve, and the fourth at three in the afternoon. In the same way the night was divided.

The division of time into weeks is arbitrary. The Greeks divided their time in portions of ten days each: the Chinese in those of fifteen, and the Mexicans in those of thirteen days. But the Jews, Oriental nations, and many others have used weeks of seven days.

The month was suggested by the phases of the moon, and hence months were originally lunar. They are divided into astronomical and civil. The astronomical months are measured by the revolutions of the moon, and the civil month is that space

of time by means of which the solar year is divided into twelve months. The length of the lunar month, or the time taken up between one new moon and the next, is 29 days, 12 hours and 44 minutes.

The year is measured by the motion of the earth round the sun, and it was formerly divided into twelve months of 30 days each; but it is now divided into months of 30 and 31 days each, excepting February which contains 28 days, but every fourth year February contains 29 days. Julius Cæsar ordained the year to consist of 365 days 6 hours, which is 11 minutes too long; the true length of the year is 365 days, 5 hours, 48 minutes and 48 seconds. To regulate this, so as to make even days, it is now agreed that the common year shall consist of 365 days; but every fourth year, called leap year, is to consist of 366 days, and to avoid the excess which this would occasion, every hundredth year is common, and contains only 365 days, such was the year 1800, excepting every four hundredth year, which is to have 366 days, such will be the year 2000. In the greater part of Europe, the new style was introduced towards the close of the 17th century, but it was not admitted into England till the year 1752, when it was determined that the year should commence on the 1st of January instead of March, as it had formerly.

Chronology not only treats of the division of time into portions of years, months, &c. but shews the application of these portions under various forms, as cycles, æras, &c. to the elucidation of history. Cycles are fixed intervals of time, composed of the successive revolutions of a certain

number of years: the principal cycles in use among chronologists are,

(1). The Lunar Cycle, which is a period of 19 years, at the end of which interval the sun and moon return to very nearly the same part of the heavens. This cycle, on account of its utility in determining the time of EASTER, is called the "Golden Number." The first year of the Christian era corresponds with the second of this cycle. To find the golden number, or year of the lunar cycle, add one to the given year, and divide by 19, the quotient shows the number of cycles which have revolved since the Christian era, and the remainder, if any, is the golden number for the year.

Example for the year 1812 :

$$\frac{1812 + 1}{19} = \frac{1813}{19} = 95 \text{ and } 8 \text{ over:}$$

Therefore there have been 95 complete cycles since the birth of Christ, and the golden number for the year 1812 is 8.—When there is no remainder, as will be the case in the year 1823, then the golden number will be 19.

(2). The Solar Cycle consists of 28 years, when the sun returns to the sign and degree of the ecliptic which he occupied at the conclusion of the preceding period, and the days of the week correspond to the same days of the month as at that time. The first year of the Christian era corresponds to the ninth of the solar cycle: if therefore 9 be added to any given year, and the sum be divided by 28, the quotient denotes the number of the revolutions of the cycle since the 9th year before Christ; and the remainder will be the cycle.

Examples for 1811 and 1812.

$$\frac{1811-49}{28} = \frac{1812-49}{28} = 65 \quad \frac{1812-49}{28} = 65 \text{ and } 1$$

over, so that the year of the cycle of the sun for the present year is 28, and for the next it will be 1.

(3). There is also another cycle, called the Cycle of the Roman Indiction, which, as it has no connection with any celestial motion, is only mentioned to say that its year is found by adding 3 to the given year and dividing by 15.

What is called the grand Julian Period is formed by the combination of these cycles, that is by multiplying the three numbers into one another; thus, $19 \times 28 \times 15 = 7980$; this is the number of years of which the Julian period consists, at the expiration of which, the first years of each of those cycles will come together.

The first year of the Christian æra corresponds with the 4714th of the Julian period, which is 710 years before the common date assigned to the creation of the world: therefore to find the year of the Julian period corresponding with any given year before or since the Christian æra: in the former case, subtract the year from 4714, and the difference is the answer: in the latter case, add 4714 to the given year, and the sum will be the year required.

Example for the year 1812.

$1812-4714 = 6526$, which is the year of the Julian period. Epochs and æras may be thus explained: an epoch is a cer-

tain point generally determined by some remarkable event from which time is reckoned; and the years computed from that period are denominated an æra. Thus, the birth of Christ is reckoned an epoch; the years reckoned from that event are denominated the Christian æra.

The most remarkable epochs are: (1). That of the creation of the world, which, by modern chronologers, is supposed to have happened 4004 years before Christ. (2). The universal deluge, computed from the year 2348, before Christ. (3). The call of Abraham, B. C. 1921. (4). The departure of the Israelites from Egypt, B. C. 1491. (5). Sir Isaac Newton has made use of the Argonautic expedition as an epoch to reckon from, which is supposed to have happened 1225 years before Christ.

The Christian æra is dated from the birth of Christ, which is supposed to have happened 4004 years after the creation, and 1811 years before the present period. See *MEMORY, Artificial*.

CHURN, an implement for agitating cream, for the purpose of making butter. Churns are made in different shapes, but they all produce the same effect. By continual motion the cream is decomposed into its parts, viz. butter and whey.

CHYLE. See the next article.

CHYME, in the process of digestion, the food taken into the stomach, is by an increased temperature, by being mixed with the gastric juice, and by the action of the stomach upon it, converted into a soft uniform mass, in which the previous texture, or nature of the aliment can be no longer distinguished. This mass is called chyme, and it passes by the pylorus into the intestinal canal, where it is

mixed with the bile. The thinner parts of it are now absorbed by the lacteals, in the form of a white liquor called chyle. This passes through the glands of the mesentery, and is at length conveyed into the blood by the thoracic duct. The principal use of the chyle is to supply the matter from which the blood and other fluids of the body are prepared; from which fluids the solid parts are formed. See ASSIMILATION, BILE.

CHRONOMETER. See LONGITUDE.

CHRYSALE, or *zurelia*, in natural history, the worm or caterpillar in its second principal state of existence. The figure of the chrysalis generally approaches that of a cone; or at least the hinder part of it is in this shape. In every species, there may be distinguished two sides; the one of which is the back, and the other the belly, of the animal. On the anterior part of the latter there may always be observed certain little elevations running in ridges: the other side, or the back, in most of the chrysalises, is smooth, and of a rounded figure: but some have ridges on the anterior part and sides of this part, usually terminating in a point and making an angular appearance. From this difference is drawn the first general distinction of these bodies, by which they are divided into two classes; the round and the angular. The first French naturalists call *jeux*; the chrysalis of the silk-worm being of this description, and so named. This division is extremely convenient to classification; the *phalane* or moths being almost universally produced by the rounded chrysalises, and the *papilio*, day-flies, from the angular. Among the latter, are some whose colours are as worthy of ob-

variation in the names of others. Many of them appear superbly clothed in gold. These species obtained the names of *chrysolite* and *austrie*; derived, the one from a Greek, the other from a Latin word, signifying gold; and from these, all other bodies of the same kind have been called by the same names.

CHRYSOLEITE, or yellowish-green topaz, a precious stone of a grass-green colour, found in the East-Indies, Brasil, Bohemia, Saxony, and Spain; in Auvergne and Bourbon, in France, and in Derbyshire, in England. The chrysolite of the ancients was the same gem that is now called topaz; the propriety of which application of the word is obvious.

CHURCH, in religious affairs, is a word which is used in several senses: 1. The collective body of persons professing one and the same religion, or that religion itself: thus, we say, the church of Christ. 2. Any particular congregation of Christians associating together, as the Church of Antioch. 3. A particular sect of Christians, as the Greek Church, or the Church of England. 4. The body of ecclesiastics, in contradistinction to the laity. 5. The building in which a congregation of Christians assemble.

High-Church, a denomination originally given to those otherwise called *non-jurors*, who refused to acknowledge the title of William III. to the crown of England, under a notion that James II. notwithstanding his exclusion, was still their rightful sovereign. The name of *High-Churchmen* is at present more usually applied to those who form pompous and ambitious conceptions of the autho-

city, and jurisdiction of the church ; ideas which, in part, distinguished its first bearers.

CINCHONA, a genus of low trees, growing to the height of 15 or 20 feet; and natives of Peru. Linnaeus describes two species, the white and the coloured; and a third has been found in the West-Indies, particularly in Jamaica and St. Lucia. The two latter are used in medicine. It was first introduced for the cure of intermittent fevers; and in these, when properly exhibited, it rarely fails of success. Practitioners, however, have differed with regard to the best mode of exhibition, both as to the time when it should be taken, and the quantity of the dose. The latter, indeed, varies with the case that requires it; and in many vernal intermittents it seems even scarcely necessary. In some instances it is found to disorder the stomach in various ways; under which circumstances, opium, and aromatics are severally employed to prevent the specific inconvenience experienced; but these additions should never be used except where necessity demands them.

CINNABAR, either a natural production, or a chemical one, the first called *native*, and the second *fartitious*, is of a fine red colour, and chiefly used in painting. Native cinnabar is the ore of quicksilver; *fartitious*, a mixture of mercury and sulphur sublimed.

CINQUE-ports, five havens that lie on the eastern coasts of England, opposite France; by name, Hastings, Romney, Hythe, Dover, and Sandwich. As places where strength and vigilance were necessary, and whence ships might put to sea in cases of sudden emergency, they formerly received consi-

detable attention from government. They were invested, by king John, with several privileges, on condition that they should provide 80 ships at their own expense, for 48 days, as often as the king in his wars should find them necessary. Each port sends two representatives, dignified with the title of barons, to parliament.

CIRCLE, in geometry, a plane figure bounded by a curve line which returns into itself, called its circumference; and which is every where equally distant from a point within, called its centre. The circumference or periphery itself is called the circle; though improperly, as that name denotes the space contained within the circumference. A circle is described with a pair of compasses, fixing one foot in the centre, and turning the other round to trace out the circumference. The circumference of every circle is supposed to be divided into 360 equal parts, called degrees and marked $^{\circ}$; each degree into 60 minutes or primes, marked $'$; and so on. 30° , 45° , 60° , 75° , 90° , 105° , 120° , 135° , 150° , 165° , 180° , 195° , 210° , 225° , 240° , 255° , 270° , 285° , 300° , 315° , 330° , 345° , 360° . is 24 degrees, 12 minutes, 15 seconds, 20 thirds. Circles have many curious properties, some of the most important of which are these:

1. The circle is the most capacious of all plane figures, or contains the greatest area within the same periphery, or the least periphery about the same area; being the limit and last of all regular polygons, having the number of its sides infinite.

2. The area of a circle is always less than the area of any regular polygon circumscribed about it, and its circumference always less than the periphery of the polygon. But on the other hand;

its area is always greater than that of its inscribed polygon, and its circumference greater than the perimeter of the said inscribed polygon. However, the area and perimeter of the circle approach always nearer and nearer to those of the two polygons, as the number of the sides of these is greater; the circle being always limited between the two polygons.

2181. The area of a circle is equal to that of a triangle whose base is equal to the circumference, and perpendicular equal to the radius. And therefore the area of the circle is found by multiplying half the circumference into half the diameter or the whole circumference into the whole diameter, and taking the fourth part of the product.

2182. CIRCLES, like other similar plane figures, are to one another, as the squares of their diameters. And the area of the circle is to the square of the diameter, as 11 to 14 nearly, as proved by Archimedes, or as as 7884 to one more nearly.

2183. The circumferences of circles are to one another, as their diameters or radii. And as the areas of circles are proportional to the rectangles of their radii and circumferences; therefore the quadrature of the circle will be effected by the rectification of its circumferences; that is if the true length of the circumference could be found the true area could be found also.

CIRCLES Druidical, in British topography, a name given to certain ancient inclosures formed by rude stones circularly arranged.

These, it is now generally agreed, were temples, and many writers think also places of solemn assemblies for councils or elections, and seats of

judgment. These temples, though generally circular, occasionally differ as well in figure as magnitude : with relation to the first, the most simple were composed of one circle. Stonehenge consisted of two circles and two ovals respectively concentric : whilst that at Bottaloh near St. Just in Cornwall is formed by four intersecting circles.

The great temple at Abury in Wiltshire, it is said, described the figura of a seraph or fiery flying serpent represented by circles and right lines. Some, besides circles, have avenues of stone pillars. Most if not all of them have pillars or altars within their penetralia or centre. In the article of magnitude and number of stones, there is the greatest variety, some circles being only 12 feet diameter and formed only of 12 stones ; whilst others, such as Stonehenge and Abury, contained the first 149, the second 652, and occupied many acres of ground. All these different numbers, measures, and arrangements, had their pretended reference, either to the astronomical divisions of the year, or some mysteries of the Druidical religion.

CIRCLES of the empire, the nine provinces of the German empire, which compose the diet. These circles consist of separate sovereign states, united under this name for the management of the common concerns of the empire. They are severally styled, the circle of Upper-Saxony, the circle of Lower-Saxony, the circle of Westphalia, the circle of the Lower-Rhine, also called the Palatinate, the circle of the Upper-Rhine, also known by the name of Hesse, the circle of Swabia, the circle of Franconia, the circle of Bavaria, and the circle of Austria. Silesia, Moravia, and Lusatia, are

countries annexed to the empire, not constituent parts.

CIRCULATION of the blood is performed in the following manner: the blood is returned to the right auricle of the heart, by the descending and ascending venæ cavæ, which, when distended, contracts and sends its blood into the right ventricle; from the right ventricle it is propelled through the pulmonary artery, to circulate through, and undergo a change in the lungs, being prevented from returning into the right auricle by the closing of the valves, which are situated for that purpose. Having undergone this change in the lungs, it is brought to the left auricle of the heart by the four pulmonary veins, and thence is evacuated into the left ventricle. The left ventricle when distended contracts, and throws the blood through the aorta to every part of the body, by the arteries, to be returned by the veins into the venæ cavæ. It is prevented from passing back from the left ventricle into the auricle by a valvular apparatus; and the beginning of the pulmonary artery and aorta is also furnished with similar organs to prevent its returning into the ventricles.

CIRCUMFERENTOR, a mathematical instrument used by land surveyors for taking angles by the magnetic needle. It is an instrument (where great accuracy is not desired) much used in surveying in and about woodlands; commons, harbours, sea coasts, in the working of coal mines, &c. &c.

Where a permanent direction of the needle is of the most material consequence in surveying, the instrument is made of brass, and in its most simple state consists of the following parts, a brass index

~~and~~ ~~staff~~ ~~off~~ ~~of~~ ~~a~~ ~~place~~. The index is commonly about 14 inches long, and an inch and a half broad, the diameter of the circle about seven inches. On this is made a chart whose meridian line answers to the middle of the breadth of the index, and is divided into 360 degrees. There is a brass ring soldered on the circumference of the circle on which screws another ring, with a flat glass in it, so as to form a kind of box for the needle, supported on the pivot in the centre of the circle. There are also two sights to screw on and slide up and down the index, as also a spangle and socket screw on the back of the circle for putting the head of the staff in.

CIRCUMPLEX, (A) in grammar, an accent, serving to note, or distinguish a syllable of an intermediate sound between acute and grave: generally somewhat long.

CIRCUMVALLATION, A line of circumvallation, is a trench bordered with a parapet, which a besieging general throws up quite round his camp, by way of security, and to prevent desertion.

CISTERN, denotes a reservoir, or vessel serving as a receptacle for rain or other water for the necessary uses of a family. Thus there are lead cisterns, jar cisterns, &c. Anciently there were cisterns all over the country of Palestine. There were some likewise in cities and private houses. As the cities for the most part were built in mountains, and the rains fell regularly in Judea at two seasons of the year only, in spring and autumn, people were obliged to keep water in their cisterns in the country for the use of their cattle, and in cities for the convenience of the inhabitants. There

are still cisterns of very large dimensions to be seen in Palestine some whereof are 150 paces long and 54 wide. There is one to be seen at Ramah of 32 paces in length and 28 in breadth. Wells and cisterns, springs and fountains are generally confounded in Scripture language.

CITRIC acid, is found in the juice of lemons, and limes, and is that which gives it the sour taste. This acid by chemical preparation may be converted into crystals, and in that state it can be kept any length of time. A very pleasant drink is made by dissolving 40 grains of the crystallized citric acid in a pint of water and then sweetening it with a small quantity of sugar.

CITY, a large town, usually corporate, and a bishop's see. Forming our ideas from what we commonly behold, we imagine that a city must necessarily be a close-built and confined plot of ground, with narrow paved ways, and a total exclusion of the face of nature; but these characteristics have originated in peculiar circumstances. Before the Roman invasion of Britain, its cities, and, among others, that of London, were extensive districts, begirt with woods or slight ramparts of earth, in which dwellings were scattered at some distance from each other. War having rendered it requisite that cities should be defensible posts, the smallness of the space they occupied became a consideration of importance. Their inhabitants were taught to crowd themselves together as much as possible; and among the expedients resorted to was that of building apartments over one another, thereby multiplying the number of dwellings without increasing the superficial mag-

nitude of the place. Trade, too, by requiring a multitude of persons upon one spot, has always been the foundation of what we now call cities. Cities usually possess, by charter, a variety of peculiar privileges; and these charters, though they now sometimes appear to be the supporters of a narrow policy, were, in their institution, grants of freedom then no where else possessed. These were the first dawnings of liberty; by these the spell that maintained the feudal tyranny was broken. *City* and *burg*, were formerly synonymous words. In England, there are twenty-five cities.

Civil-law, a body of laws or institutes, published under the reign of Justinian, Emperor of Rome, and mingled more or less with the jurisprudence of the states of modern Europe. With respect to the origin of this celebrated code, we are told by M. De Lolme, that the law-collection, or system, that was formed by the series of edicts published at different times by the prætors, was called *jus prætorium*, and also *jus honorarium*, (not strictly binding). The laws of the twelve tables, together with all such laws as had at any time been passed in the assembly of the people, were called, by way of eminence, the *jus civile*. In England, a general dislike has always been entertained against the civil law; a circumstance which the author already quoted attributes to its having been introduced by the clergy and written in a language which only the clergy could understand. It happened, therefore, by a somewhat singular conjunction of circumstances that to the Roman laws, brought over to England by monks, the idea of ecclesiastical power became associated, in the same manner as the idea of regal



respective evidences, and that the prisoner may object to such as he thinks proper. This done, the depositions of those witnesses who are adjudged upon trial to be exceptionable, are set aside: the deposition of the others are to be laid before the judges, as well as the answers of the prisoner, who has been previously called upon to confirm or deny them in the presence; and a copy of the whole is delivered to him, that he may, with the assistance of a counsel, which is now granted him, prepare for his justification. The judges are to decide both upon the matter of law and upon the matter of fact, as well as upon all incidents that may arise during the course of the proceedings, such as admitting witnesses to be heard in behalf of the prisoner, &c. This mode of criminal judicature may be useful as to the bare discovering of truth; but, at the same time, a prisoner is so completely delivered up into the hands of the judges, who can even detain him almost at pleasure by multiplying or delaying his examination, that wherever it is adopted, men are almost as much afraid of being accused as of being guilty, and especially grow very cautious how they interfere in public matters.

CLAN, a family or tribe, living under one chief. This appears to have been the original condition of the savages of northern Europe; and from this we ought to trace the germ of the feudal system. All the members of a clan held their lands of the chief, followed him to war, and were expected to obey him in peace. Some imagine the word *clan* to be only a corruption of the Latin *colonia*; but Mr.

Whittaker, with more apparent propriety, considers it as purely British, signifying a *family*.

CLARIFICATION, the process of clearing or fining any fluid from all heterogeneous matter or feculence, and is distinguished from filtration by the employment of chemical means, whereas the latter is only a mechanical operation. Clarification is performed either by heat, or by the addition of some substance which will unite with, and precipitate or raise to the surface the matters which render the liquor turbid. The substances usually employed are white of eggs, blood, and isinglass: the two first are generally used for such liquors as are clarified while hot; the last for such as are clarified in the cold state, such as wines, &c.

CLARION, a kind of trumpet, the tube of which is peculiarly narrow, and the tone acute and shrill.

CLARO-obscuro (Latin), *chiaro-oscuro* (Italian) and *clair-obscur* (French), a phrase in painting, signifying light and shade. In pictural criticism, it means the relief that is produced by light and shade, independently of colour. In the art itself, it denotes that species of painting or design, in which no attempt is made to give colours to the objects represented, and where, consequently, light and shade are every thing.

CLASS, an appellation given to the most general subdivisions of any thing. Thus in the Linnæan system of natural history, the animal creation is divided into six classes, viz. Mammalia, Aves, Amphibia, Pisces, Insecta, and Vermes.

CLASS, in Botany, denotes the primary division of plants into large groups, each of which is to be subdivided by a regular downward progression,

into orders, genera and species, with occasional intermediate subdivisions, all subordinate to the division which stands immediately above them. So that the classes have been compared to the first layer of a truncated pyramid, which increases gradually as it receives the orders, general and occasional intermediate subdivisions, till at length it terminates in an immense base, consisting entirely of species.

CLASSIC, a literary term, signifying excellent, or of the first class. It is said to owe its origin to the division of the Roman people into classes, the first of which was called, by way of eminence, the *classic*.

CLAY, a genus of earths at present considered simple and primitive; that is, not decomposable into any other simple substances. See **EARTHS**.

CLEF, or *cliff*, derived, through the French, from the Latin *clavis*, "a key," a character in music, placed in the beginning of a stave, to determine the degree of elevation occupied by that stave, in the general claviary or system, and to point out the names of the notes which it contains in the line of that clef. By it is expressed the fundamental sound in the diatonic scale, which requires a determined succession of tones or semitones, whether major or minor, peculiar to the note from which we set out; and hence, opening, as it were, a way to this succession, the technical term *key* is used with great propriety.

CLEPSYDRA, a water clock, or an instrument to measure time by the fall of a certain quantity of water. There were many kind of clepsydræ among the ancients, but they all had this in common, that

the water ran generally through a narrow passage, from one vessel to another, and in the lower vessel, was a piece of cork or light wood, which as the vessel filled, rose up by degrees, and showed the hour.

CLERGY, a general name given to the body of ecclesiastics of the Christian church, comprehending bishops, priests, and deacons. A clergyman cannot be compelled to serve on a jury, nor to appear at a court-bench, or view of frank pledge; neither can he be chosen to any temporal office, as bailiff, reeve or constable. During his attendance on divine service, he is privileged from arrests in civil suits. In certain cases of felony, he has the benefit of his clergy, without being branded in the hand, or suffering the punishment substituted for that branding by statute, or at most, only an imprisonment for one year; and this as often as he offends. Clergymen have been recently declared incapable of sitting in the house of commons, a point formerly undecided. They cannot take any lands or tenements to farm, upon pain of fine, to the amount of £ 10. per month, and total avoidance of the lease; nor upon like pain keep any taphouse, or brewhouse; nor engage in any manner of trade: nor sell any merchandize, under forfeiture of treble the value. 21 Hen. VIII. c. 13.

CLERGY, *Benefit of*, under the article **BENEFIT of Clergy**, is said to have meant "*benefit of learning*."

Other authorities appear to justify a different explanation, which shall be given in this place. It is true that in the old English writers, a *clerk* signifies a *literate man*; but it is evident that he who could write and read was called a clerk because in this

respect, he resembled an ecclesiastic, rather than that an ecclesiastic was so called because he could write and read: the word *clerk* being derived from the Greek *cleros*, a name always appropriated to the priesthood, because synonymous to that given to the tribe of Levi, and signifying a *lot* or *heritage*, by which expression was intended the service of God: a duty that in the tribe of Levi, was a *lot* or *heritage*. With respect to the benefit of clergy, it appears that it was actually a benefit of the ecclesiastical profession; but that from the loose terms, or vague idea, of the law, to be attributed perhaps to the

lege, should not be resigned to the ecclesiastical authority, as formerly (a practice which had been found pregnant with the most scandalous abuses), but confined, at the discretion of the judge, for any term not exceeding one year. Under Mary, James I. and William and Mary, the original design of the provision was entirely lost. Certain small crimes were said to be within the benefit of clergy, and were punished accordingly, though the prisoners, if women, were not required to read. All women, and all male commoners who could read, were punished in this manner; and clerks in orders, though they might be imprisoned, could not be burnt on the thumb. This latter is easily accounted for: the clerk could, as he still can, claim the benefit of his clergy again and again; but the women and laymen were allowed the privilege but once: the burning on the thumb was a mark by which the offender might be known, after having once pleaded his clergy; and as the clerk might always plead it, this precaution, in his case, would have been useless. When, in a more enlightened age, it was perceived that the knowledge of the offender did but increase his guilt; and that if the punishment of death for a simple felony were too severe for those who had been liberally instructed, it was still more so for the ignorant, a statute, 5 Ann, c. 6. enacted that the benefit of clergy should be granted to all, the nature of whose offences entitle them to ask it, without requiring any proof that they can read. In this state the *benefit of clergy* stands at present; with the exception, that the court, in its discretion, may substitute transportation for seven years, for burning in the hand and

imprisonment. The clergy, as exempted from burning in the hand, and the imprisonment with hard labour, are also exempted from transportation. The privilege of peerage is in all respects similar to the benefit of clergy.

CLERK, a word originally used to denote a learned man, a man of letters: whence the term is appropriated to churchmen, who were called clerks or clergymen: the nobility and gentry being bred to the exercise of arms, and none left to cultivate the sciences but ecclesiastics. See **CLERGY**.

CLIMACTERIC, among physicians and astrologers, a critical year in a person's life. According to some this is every seventh year, but others allow only those years produced by multiplying 7 by the odd number 3, 5, 7, 9, to be climacteral. These years they say bring with them some remarkable change with respect to health, life or fortune; the grand climacteric is the 63d year, but some making two add to this the 81st: the other remarkable climacterics are the 7th, 21st, 35th, 49th, and 56th.

CLIMATE, or *clime*, in geography, a division of the surface of the globe, parallel to the equator, of such a breadth as that the longest day in the parallel nearer the pole exceeds the longest day in that next the equator by a certain space of time; as, half an hour. The *beginning* of the climate is, a parallel circle wherein the day is shortest; the *end* of the climate, that wherein the day is longest. There are several climates in one zone. As the climates commence from the equator, the first climate at its beginning has its longest day precisely twelve hours long, and at its end, twelve hours and a half. The rest proceed in the same manner.

as far as the polar circles, where the *hour-climates* are said to terminate, and the *month-climates* to commence. The *month-climate* is a space terminated between two circles parallel to the polar circles, whose longest day-light is longer or shorter than that of its adjoining one by thirty days. In common speech, the term *climate* is applied to a peculiar state of the atmosphere; and the different parts of the world are spoken of as different climates, not on account of the length of the days, but of the heat of the atmosphere, and other natural circumstances. In this sense, the peculiarities of climates are of infinite importance in the economy of nature. On these, all the productions of the earth are dependent. Even man, who is justly said to be the creature of all climates, indures only by yielding to their influence. This influence has been too much controverted by Helvetius, and perhaps Montesquieu has allowed it too much importance: neither the one nor the other drew his observations from those quarters where most information is to be had, among men still living in a state comparatively wild. In countries where life may be maintained almost without exertion, and every pleasure of the senses is lavished, man is, and must be, a very different being from the native of a less bountiful soil and less indulgent climate, whose subsistence can only be obtained by a constant stretch of his faculties. We are accustomed to call the people of fruitful countries supine; and they term us restless. They sit still, because their wants are supplied; we roam from one end of the world to the other, because ours are craving.

CLIMAX, or *gradation*, a figure in rhetoric, con-

sisting of an assemblage of particulars, forming a whole in such a manner that the last idea in the former member becomes the first in the latter; and so on, step by step, till the climax or gradation is completed. Its strength and beauty consists in the logical connection of the ideas, and the pleasure the mind receives from perfect conviction; as may be perceived in the following example: "There is no enjoyment of property without government; no government without a magistrate; no magistrate without obedience; and no obedience where every one acts as he pleases."

CLOCK, a machine for measuring time, called, when first invented, a nocturnal dial, to distinguish it from the sun-dial. On the credit of an epitaph recorded by Pavanius, some have attributed this invention to Pacificus, who lived in the time of Lotharius, son of Lewis the *Débonnaire*. Others ascribe it to Boethius, about the year 510. Clocks, like those now used, were either first invented, or at least revived somewhat more than two centuries ago. The contrivance of pendulum-clocks took place about the middle of the seventeenth century, either in Italy or in Holland. The first made in England was by a Dutchman, in the year 1662: See **HOROLOGY**.

CLOTH, a manufacture either of wool or linen. The best wools for manufacturing of cloths of that kind are those of England and Spain; and of these, those of Lincolnshire in the one, and Segovia in the other, are preferred. To use wool to the best advantage, it must be scoured, by putting it into a liquor somewhat more than warm, and when it has continued long enough, to dissolve the grease, drain-

ing it, and washing it thoroughly in running water. When it feels dry, and has no smell but that natural to the sheep, it is said to be sufficiently scoured. After this, it is hung to dry; this is done in the shade, the heat of the sun making it harsh and inflexible. When dry, it is beat with rods, on hurdles of wood, or on cords, to cleanse it from dust and the grosser filth. The more it is thus beat and cleansed, the softer it becomes, and the more adapted to spinning. After beating, it must be well picked, to free it from the filth that has escaped the rods. It is now in a proper condition to be oiled, and carded on large iron cards placed slopewise; and this done, it is given to the spinners, who first card it on the knee, on small cards, and then spin it on the wheel, observing to make the thread of the warp smaller by one third than that of the woof; and much more compactly twisted. The thread thus spun, is reeled, and made into skeins: that designed for the woof is wound on little tubes, pieces of paper, or rushes, so disposed as that they may be easily put in the eye of the shuttle; that for the warp is wound on a kind of large wooden bobbin, to dispose it for warping. When warped, it is stiffened with size; and when again dry, is given to the weaver, who mounts it on the loom. The warp thus mounted, the weavers, of whom each loom has two, one on each side, tread alternately on the treadle, first on the right step and then on the left, which raises and lowers the thread of the warp equally; and between it they throw the shuttle transversely, from one to the other. Every time that the shuttle is thus thrown, and a thread of the woof inserted within the warp, they strike it con-

jointly with the same frame wherein is fastened the comb or reed, between the teeth of which the threads of the warp are passed, repeating the stroke as often as is necessary. The weavers having continued their work till the whole warp is filled with wool, the business of the loom is finished. The cloth is then taken off, by unrolling it from the beam whereon it had been wound as it was wove, and given to be freed from knots, ends of threads, straws, and other irregularities; which is done with iron nippers. In this condition it is carried to the fullery to be scoured. The cloth, being again cleansed of the matter with which it is full-
ed, is returned to the former hands, to have the lesser impurities, &c. taken off as before, and then re-delivered to the fuller, to be beat and fulled with hot water, wherein a proper quantity of soap has been dissolved. After fulling, it is taken out to be smoothed or pulled by the lists, lengthwise, to take out the wrinkles, &c. The smoothing is repeated every two hours, till the fulling be finished, and the cloth brought to its proper breadth: after which it is washed in clear water, to purge it of the soap, and given wet to the carders to raise the hair or nap on the right side with the thistle. After this preparation, the clothworker takes the cloth, and gives it its first cut or shearing: then, the carders resume it, and after wetting, give it as many more courses with the teazle as the quality of the stuff requires, always observing to begin against the grain of the hair, and to end with it; as also to begin with a smoother thistle, proceeding still with one sharper and sharper, as far as the 6th degree. After these operations, the cloth, being dried, is

returned to the clothworker, who sheers it a second time, and returns it to the carders, who repeat their operation as before, till the nap be well ranged on a one end of the piece to a wove, scoured, napped, yer. When dyed, it is and the worker with his, while wet, and hangs it stretched both in length and smooth it, set it square, mensons, without strain, to brush it afresh, while the nap. When quite nters, and brushed again laying of the nap; after id cold under a press, to and even, and give it a from the press it is in a is of mixed colours are ly dyed. In the islands is made from tree-bark,

apours, consisting of par-
l other substances, which

the heat of the sun, and the action of terrestrial bodies cause to rise above the face of the globe, to the height, as some have supposed, of a mile or two. Clouds are of various kinds according to the prevalence of any one of these component parts, and particularly according to the quantity of electric fluid they contain. When clouds assume strange and whimsical shapes, varying almost every moment, and small ones meet each other in the air, and vanish upon contact, thunder is thought to be at

hand. The vanishing, or dissipating, upon contact, is accounted for on the hypothesis, that two clouds, electrified, the one positively and the other negatively, in meeting, part with their electricity, and thus destroy each other. The uses of clouds are evident. From them proceed the rain which refreshes the earth; and without which its whole surface must be one desert. Clouds are likewise screens interposed between the earth and the scorching rays of the sun, which are often so powerful as to destroy the more tender vegetables. In the less discoverable operations of nature where the electric fluid is concerned, clouds have a principal share; and, particularly, serve as a medium for conveying that subtle matter from the atmosphere to the earth, and from the earth into the atmosphere. See METEOROLOGY.

COACH, a commodious vehicle for travelling, invented by the French. Even in France, however, the coach was not very anciently known, since it is scarcely mentioned before the reign of Francis I. At first, its use was confined to the country; and writers observe that there were at this period no more than two coaches in Paris: the one that of the queen, and the other that of Diana, natural daughter of Henry II. The first courtier who had one was Jean de Lava de Bois Dauphin, whose enormous bulk disabled him from travelling on horseback. The first coach ever publicly seen in England, was part of the equipage of Henry, earl of Arundel, in the reign of Elizabeth. Mr. Tull, the son of a gentleman who wrote on husbandry, first imported the post chaise. Hackney-coaches are these exposed to hire, in the streets of London and

other great cities, at rates fixed by authority. Stage-coaches are those which undertake to convey travellers from one city to another. Mail-coaches are stage-coaches of a peculiar construction, for the prevention of overturning ; and which, for a certain consideration, carry his majesty's mails, or bags of letters to and from the general post office, protected by a guard, and subject to the regulations of government. They are obliged to depart and arrive at certain hours, and the number of their inside passengers is restricted to four. J. Palmer, esq. M. P. for Bath, has the merit of this establishment, which experience has shown to be of the greatest advantage to the trade and correspondence of Great Britain.

COAKS, fossil-coals, charred, or made to undergo a process similar to that by which *charcoal* is produced. Cocks are used for exciting intense heat, as in smelting iron ore ; and for operations where the acid and oily particles of coals, of which they are deprived by charring, would be detrimental ; as drying malt.

COAL, in mineralogy, a solid inflammable substance, supposed to be of a bituminous nature, and commonly used for fuel. Of this substance there are various species.* Several kinds of coal are often found mixed with one another. There is scarcely any substance so useful to mankind as this ; and it is dealt out to us with an unsparing hand. The mines of this article seem to defy the power of man to exhaust. It is always found in masses, sometimes in a heap, most frequently in beds, which are usually separated by layers of stones.

The principal mines of this useful mineral are

these of Newcastle and Whitehaven. The town of Newcastle absolutely stands on beds of coals, which extend to a considerable distance round the place. The principal opening for men and horses to the mines at Whitehaven is by an opening at the bottom of the hill, through a long passage hewn in a rock which by a steep descent leads down to the lowest vein of coal. The greatest descent is through spacious galleries, which continually intersect each other; all the coal being cut away except large pillars, which, in deep parts of the mine, are three yards high, and twelve square at the base. The mines are sunk to a depth of 7 or 800 feet, and are extended under the sea to places, where above them, the water is sufficient for ships of very large burthen. These are the deepest coal mines that have hitherto been wrought, and, perhaps, the miners have not in any other part of the globe, penetrated to so great a depth below the surface of the sea. There are seventy kinds of coals brought to the London market, divided into four classes. The first class contains six kinds of coal, called Walls-end, Bigg's-main, Walkers, Heaton-main, Willington and Hepburn-main. The Walls-end, which is rather a small coal, is the dearest by about sixpence a chaldron.

COAL, Small, a sort of charcoal; prepared from the spray and brushwood stripped from the branches of coppice-wood.

COALERY, coalier, colliery, or coal-mine, a coal-work, or place where coals are dug. There are several countries in Europe which possess considerable coal-mines; as France, Germany, and Sweden; and in America, coal has been discovered.

and wrought in Newfoundland, Cape-Breton; Canada, and some of the New-England provinces : but in all these parts of the world the coal is of a quality much inferior to that of Britain, and entirely unfit for the use of several manufactures ; so that even they import a large quantity from the latter. The most remarkable coal-work ever known in this island was that under the Firth or Forth, at Burrowstowness. The veins were found to continue under the bed of the sea, and the colliers had the courage to work them nearly half its width. At the distance of half a mile from the shore, there was a shaft that went down into the mine ; and this was made into a kind of round key or mote, as it is called, built so as to keep out the sea, which flowed there twelve feet. Here the coals were laid ; and a ship of that draught of water could lie her side to the mote, and take in the coal. This famous colliery belonged to the earl of Kincardine's family ; and continued the wonder of all that saw it, and greatly profitable to the owners, during many years : but, at length, a tide of unwonted height filled the whole at once ; and the labourers, who had no time to escape, perished in it.

COAT OF ARMS, in the modern acceptation, is a device, or assemblage of devices, supposed to be painted on a shield ; which shield, in the language of heraldry, is called the field. Under this sense, see HERALDRY ; but that subject will receive considerable elucidation from the following account of the ancient and original coat of arms. This, which is still the official dress of a herald, was a habit worn by the knights both in war and tournaments, a sort of surcoat, reaching nearly to the waist, open

at the sides, with short sleeves, sometimes furled with ermine or other hair, upon which were fixed the armories or badges of the knights, embroidered in gold and silver, and enamelled with heated tin, coloured black, green, red, or blue; whence the rule never to apply colour on colour, or metal on metal. The coats of arms were frequently open, and diversified with bands and fillets of several colours, alternately placed, as we still see cloths scattered, watered, &c. Hence they were called *divided*, as being divided, and composed of several pieces sewed together; whence the names *fess*, *pale*, *chevron*, *band*, *cross*, *saltier*, *surge*, &c. which have since become honourable pieces, or ordination of the shield.

COATING, in chemistry, is used principally for the purpose of defending certain vessels from the immediate action of fire; thus, glass retorts and the inside of some furnaces, are coated with various compositions.

COATING, in electricity, means the covering of electric bodies with conductors, or the latter with the former, or, lastly, electrics with other electrics. Electrics are coated with conductors for the purpose of communicating to, or removing from their surfaces, the electric fluid in an easy and expeditious manner; otherwise an electric body, on account of its non-conducting property, cannot be electrified or deprived of the electric fluid without touching almost every point of its surface with an electrified or other body. This coating generally consists of tin-foil, sheet lead, gilt paper, gold leaf, silver leaf, or other metallic body, either in the form of a thin

extended lamina, or in small grains, such as brass filings and leaden shot. The coating may be fastened to the surface of the electric by means of paste, glue, wax, or other adhesive matter.

COCHIN-CHINA, a country of Asia bounded on the north by Tonquin, on the east by the Indian sea, part of which between the Continent and the island of Hainan, is called the gulf of Cochin-china, on the south it is bounded by Chiampa and on the west by Laos and Cambodia. This kingdom contains about 50 good sea port towns, and is divided into six provinces, to each of which belongs a governor and a seat of justice. It is about 150 leagues in length and 35 in breadth. The manners of the inhabitants are simple, they are affable, mild, laborious, and hospitable; their chief nourishment consists in rice and fish. They believe in the transmigration of souls.

COCHINEAL, an insect, the *coccus-cacti* of Linnaeus, who has given it that name because it feeds upon the Indian fig-tree. The cochineal is a native of the warmer parts of America. It is an article of commerce, on account of the red colour of incomparable beauty, which it communicates to wool and silk. Linen and cotton do not take the colour to so much advantage. This creature is found in most abundance at Oaxaca, where the breeding of it forms the chief employment of the Indians.

Cock-fighting, the actor entertainment of setting game-cocks to fight, which, to the disgrace of England, holds a prominent rank among the amusements of the vulgar; and was till lately permitted in a sort of theatre called the Royal

Cock-Pit, in Westminster. The Gentleman's Magazine for April, 1789, contains the following record: "Died, April 4th, at Tottenham, John Ardesoif, esq. a young man of large fortune, and in the splendour of his carriages and horses, rivalled by few country gentlemen. His table was that of hospitality; where it may be said he sacrificed too much to conviviality; but if he had his foibles, he had his merits also, that far outweighed them. Mr. Ardesoif was very fond of cock-fighting; and possessed a favorite cock on which he had won many profitable matches. The last bet he laid upon this cock, he lost; which so enraged him, that he had the bird tied to a spit, and roasted alive before a large fire. The screams of the miserable animal were so affecting that some gentlemen, who were present, attempted to interfere, which so increased Mr. Ardesoif's anger that he seized a poker, and with the most furious vehemence declared that he would kill the first man who interposed: but in the midst of his passionate asseverations, he fell down dead upon the spot. Such, we are assured, were the circumstances, that attended the death of this great pillar of humanity." **Cock-fighting** is a mixture of barbarity, and of that most disastrous of passions, the passion of gaming.

COCKER, a seal belonging to the king's custom-house: likewise a scroll of parchment, sealed and delivered by the officers of the custom-house to merchants, as a warrant, that their merchandize is entered.

COCKNEY, a very ancient name for a citizen of London; concerning the origin of which nothing

satisfactory appears. We may be permitted to doubt whether it was, at first, a word of ridicule. We learn from the following verses, which are attributed to Hugh Bagot, earl of Norfolk, that it was in use in the time of Henry II.

“ Was I in my castle at Buryay,
Fast by the river Waveney,
I would not care for the king of Cockney.”

[i. e. the King of London.]

The king of the Cockney is spoken of in the regulations for certain sports, formerly held in the Middle Temple, on Childermas day.

CODE, a collection, or system, of laws. Justinian's code is distinguished by the appellation of *code* in the way of eminence.

CODICIL, a writing, by way of supplement to a will, containing any thing which the testator wishes to add; or any explanation, alteration, or revocation. A codicil must be executed with the requisite formalities.

CORPSE, the chest in which a dead body is usually put for interment. The sepulchral honours paid to departed friends in ancient times are extremely curious. Their being put into a coffin was with them considered as a mark of the highest distinction; though with us the poorest people have their coffins. At this day, in the East, they are not at all made use of; and Turks and Christians, as Thovenot assures us, agree in this. The ancient Jews seem to have buried their dead in the same manner; neither was the body of Christ, it should seem, put into a coffin; nor that of Elisha (2 Kings xiii. 21.) whose bones were touched by the corpse that was let down a little after into the

sepulchra. However, that coffins were anciently in use of in Egypt all agree, since antique coffins of stone and sycamore wood are still to be seen in that country; not to mention those said to be made of a kind of pasteboard, formed by folding or gluing cloth together a great many times, curiously plastered, and then painted with hieroglyphics. It being an ancient Egyptian custom, and not practised in the neighbouring countries, was doubtless the cause that the sacred historian expressly observes of Joseph, that he was not only embalmed, but put into a coffin too; both being customs that were peculiar to the Egyptians.

We have, among other ingenious inventions, patent coffins, which effectually preclude the depredations of those that obtain a livelihood by robbing cemeteries. The security of this contrivance arises chiefly from making the coffin so very strong as to resist the instruments usually employed by what are termed "resurrection men" and by making the lid to fit on with spring plugs, fitting into hitched sockets; so that being once closed they never can be severed, except by breaking the coffin to pieces.

Cohesion, in natural philosophy, as distinguished from adhesion, is that species of attraction which, uniting particle to particle, retains together the component parts of the same mass. Whatever the cause of cohesion may be, its effects are evident and certain. The different degrees of it constitute bodies of different forms and properties. Thus Newton observes, the particles of fluids which do not cohere too strongly, and are small enough to render them susceptible of those agitations which

keep liquors in a fluid state, are most easily separated and rarefied into vapour, and make what the chemists call volatile bodies; being rarefied with an easy heat, and again condensed with a moderate cold. Those that have grosser particles, and so are less susceptible of agitation, or cohere by a stronger attraction, are not separable without a greater degree of heat, and some of them not without decomposition.

Modern Chemists have agreed to consider the attraction of cohesion as the instrument of aggregation, or the union of 'similar' compounds, and are careful not to confound it with the ELECTIVE attractions (which see) though there may in strictness be no difference between them. In estimating the absolute cohesion of solid pieces of bodies, Muschenbroek applied weights to separate them according to their lengths; his pieces of wood were long square parallelopipedons, each side of which was the 26th of an inch, and they were drawn asunder by the following weights:

	lbs.
Fir	800
Elm	950
Alder	1000
Linden	1000
Oak	1150
Beech	1250
Ash	1250

He tried also wires of metal 1-10th of a Rhinland inch in diameter, the metals and weights are as follows:

	lbs.
Lead	29½
Tin	40½

Copper	- - - - -	999
Yellow Brass	- - - - -	360
Silver	- - - - -	375
Iron	- - - - -	450
Gold	- - - - -	800

COHORT, the name of part of the Roman Legion composing about 600 men. There were ten cohorts in a Legion, the first of which surpassed all the rest in dignity and the number of men.

COIF, the badge of serjeants of law who are called serjeants of the coif, from the lawn coif they wear under their caps when they are created serjeants. The ancient use of the coif was to 'cover' the clerical tonsure.

COIN, money stamped with a legal impression. Strictly speaking, coin differs from money as the species differ from the genus. See CLASS. Money is any matter, whether metal, or paper, or beads, or shells, &c. which have currency as a medium in commerce. Coin is a particular species always made of metal, and struck according to a certain process called coining.

The British coinage is wholly performed at the Tower of London, where there is a corporation for the purpose, under the title of the MINT, which see.

The following are the coins and exchanges of the principal kingdoms and states of, or connected with, Europe :

Great Britain. Accounts are kept in pounds, shillings, pence, and farthings. One pound is equal to 20 shillings, one shilling to 12 pence or pennies, one penny to 4 farthings. The coins of gold are, the guinea, equal to £.1 1s. half-guinea to 10s. 6d.

and pieces of 7s.—Of silver, the crown, equal to 5s. half-crown, equal to 2s. 6d. shillings to 12 pence, six-pence to 6d. ; of copper, two-pennies, pennies, half-pennies and farthings. For the course of exchange between Great Britain and other countries, see those countries.

Ascheen, in the island of Sumatra.—Accounts are kept in tayels, padarves, and masses. One tayel equal 4 padarves, and one padarve equal 4 masses. The mass is most current money, and is of gold, and worth about 15d. three farthings, English.

Alcppo, *Alexandretto*, and *Sanderoon*. Accounts are kept in piastres of eighty aspers, see Turkey.—The same coins pass here as in Turkey.

Alexandria, in Egypt, and *Cairo*. Accounts are kept in piastres or dollars, of thirty medinas, each dollar worth 4s. 6d. sterling. The real money is the ducat of 24 medinas. A medina is worth three aspers of Turkey. The purse contains 75,000 aspers.

Alicant, in Spain. Accounts are kept in libras or passos, equal 20 sueldos, sueldos equal 12 dineros; also by rials of 24 dineros. A libra is equal to 5s. 7d. halfpenny sterling.

United States of America. Accounts in America are kept in dollars, dismes, and cents. One dollar is worth 4s. 6d. st. One dollar equal 10 dismes, one dime equal 10 cents. The coins of Britain, France, Spain and Portugal, are current here; the American States have not yet issued any coin of their own.

Amsterdam and the *Province of Holland*. Accounts kept in florins or guelders, stivers or skillings, and deniers or penninga. One florin equal

20 stuivers, and one stuiver equal 16 pennings. The gross pound is worth 6 florins or guelders. The current coins of Holland are rixdollars worth about 4s. 6d. ster. guelders or florins 1s. 9d. skillings 6d. 3-tenths, these are of silver; stuiver of copper 1 penny 1-twentieth, the grote the fourth part of a stuiver, the duyts the half a grote, and the penning half a duyts. There are also ducats of Holland, worth £.1 16s. ster. and silver ducateons worth 5s. 8d. The exchange between England is by shillings and skillings, 20 English shillings being worth about 37 Dutch skillings.

Ancona. Accounts are kept in scudi of 20 soldi, and soldi of 12 denari; and also by paoli, 10 of which make a scudo. The coins of Rome are current here.

Barcelona, in Spain. Accounts are kept in libras or catalan pounds of 20 sculdes, each sculdo of 12 dineros. A catalan pound is worth about 5s. 7d. sterling. England has no exchange on Barcelona.

Bassora. Accounts are kept in mamoudis of 10 danimes, danimes of 10 flouches, tamen of 100 mamoudis. Coins current, of gold, are the sequin of Cairo, equal 13 mamoudis, 5 danimes; sequin gengirly equal 15 mamoudis;—of silver, mamoudi, worth 8d. sterl. abassi (old) equal 2 mamoudis, abassi, (new) equal 2 mamoudis, 2 danimes. Of copper; danime.

Batavia. Accounts are kept in piastres or dollars of 60 stuivers each.—The real money current here are the Spanish dollar and the ecu of France and Holland.

Bengal. Accounts are kept in rupees of 16 annas. One anna equal 12 pieces. A crore is 100 lacs,

a lot 100,000 rupees. Rupees are of various kinds. Rupee sicca, a Mogul coin, worth about 24 and an half Dutch stuivers, or 2s. 6d. ster. Bombay rupee about 3 per cent. worse than the sicca. Asa-see rupee about 6 per cent. worse than the sicca.

Berlin. In this city, Magdebourg, Francfort, on the Oder, and other places in the electorate of Brandenburg, they reckon by thalers of 24 gute-groschen. One gute-grosche equal 12 pfeninga. The coins of the kingdom of Prussia are, of gold; the Frederic of 5 thalers, value 17s. 6d. ster. the ducat of 2 three-fourths thalers, value 9s. 4d. ster. Of silver; the thaler of 24 gute-grosches, value 3s. 6d. ster. Of copper; pieces of 3 and of 1 pfening.

Bologna, in Italy. Accounts are kept in lira of 20 soldi; soldi of 12 denari. The lira is 1s. English. The coins of Bologna are, pistoles, 15s. 6d. crown; 5s. ducatoons, 5s. 3d. zendi, 4s. 3d. testoons, 1s. 6d.

Bombay. Accounts are kept as in England, or by rupees. The coins current in Bombay are, rupees of silver worth about 2s. 3d. rupees of copper worth about 1d. and 1-6th, mohur of gold worth 12 and an half rupees of silver. Pagodas worth 2s. ster.

China. Accounts are kept in lyangs or tayels of 10 mass, mass of 10 candareen, candareen of 10 cals. The lyang or tayel of silver is worth 3 florins; 14 stuivers of Holland, or 6s. 8d. ster. Mass, 8d. Candareen, 4-8th of a penny.

Cologne. Accounts are kept in thaler of 80 allbus con an, allbus of 12 hellers. The coins are, of silver, 1 thaler or 100 hellers, 8d. 1 guilder, 2s. 4d.

1 conatrad 2d. 2 thirds, 1 plaphert 2d. 1-10th —
Of copper, 1 stuyver equal 7-10ths of a penny.

Danish. Accounts are kept in guelders or florins of 20 grascas. — The coins are, of gold, the Broderie, worth about 17s. 6d. the ducat, worth about 8 florins or 9s. 4d. ; — silver, ryksdalers of 3 florins, or 3s. 6d.

Denmark. — Accounts are kept in ryksdalers or riksdallers of 6 marks, marks of 6 Danish skillings, skillings of 8 stivers. — The coins current in Denmark are, gold, the ducat of 11 marks or 8s. 3d. ; — silver, the ryksdaler of 6 marks or 4s. 6d. crown of 4 marks or 8s.

Flanders and Brabant. Accounts are kept in pounds Flemish of 20 schellings, schellings of 14 groats, or by florings or guelders of 20 stivers, and stivers of 12 pennings. — The coins current in Flanders are, gold, ducat, worth 9s. 3d. sterling; silver, scheling worth 6d. 7-10ths.

France. Accounts were formerly kept in livres, sous, and deniers. tournois. — One livre was equal to 20 sous, and one sous worth 12 deniers; the livre was nearly equal to 10d. sterling. — The exchange between Great Britain and France was carried on by a fictitious money, called an ecu of 3 livres, which, when exchange was at par, was worth about 2s. 6d. — The coins of France were, of gold, the double louis-d'or of 48 livres, single louis-d'or 24 livres, half louis-d'or 12 livres; — of silver, ecu of 6 livres, half ecu, equal to an ecu of exchange, 3 livres: there were also coins of the fifth, the tenth, and the twentieth of an ecu; of billon, or brass, pieces of two sous, one sou and half sou; — of copper, the double hard worth half

a *sol*, and the *liard* worth 3 *deniers*.—The coinage of the republic is regulated by its new metrical system. The lowest denomination, or unit, of coin, called a *franc*, is a silver piece of five grammes, containing 1-10th alloy, and 9-10ths pure silver, and is worth one *livre* and three *deniers-tournois*. The proportion of the new money to the old, is as 81 to 80. It is divided into *decimes* and *centimes*. The gold coin, like the silver, has 1-10th alloy, An hectogramme of gold is worth 25 francs.

Frankfort. Accounts are kept in *rixdollars* of 90 *kreutzers* and *kreutzers* of 4 *pfenings*.—The coins are, the gold ducat of 2 *rixdollars* and 60 *kreutzers*, or 9*s.* 4*d.*—Silver, dollar of 120 *kreutzer*, or 4*s.* 8*d.*

Geneva. Accounts are kept in *livres* of 20 *sols*, *sols* of 12 *dence*.—A *lyre* is equal to 1*s.* 8*d.* *sterl.*—The coins are, ducat, worth 2*s.* *sterl.* *croisade*, worth 5*s.* 10*d.* *sterl.*

Genoa. Accounts are kept in *lire* of 20 *soldi*, *soldi* of 12 *denari*.—The coins are of gold, *pistole* value 20 *lire* or 14*s.* 4*d.* *sterl.*—Of silver, *gensen* 6*s.* 2*d.* *testoon* 1*s.* *cavelot* 1*d.* $\frac{1}{2}$ $\frac{2}{3}$.—Of copper, *soldi* $\frac{4}{10}$.

Hamburgh. Accounts are kept in marks of 16 *skillings*, *lubs*, *skilling* of 12 *pfenings*.—The *ryksdaller* is 3 marks, dollar of exchange is 2 marks.—The coins of Hamburgh are, of gold, ducat worth 7 marks or 18*s.* 6*d.*—Silver *rix-dollar*, 3 marks, or 4*s.* 6*d.* *thaler*, 2 marks, or 3*s.* *mark*, 1*s.* 6*d.*

Hanover. Accounts are kept in dollars of 24 *marriengroschen*, of 12 *pfenings* each.—The coins are the ducat 9*s.* 2*d.* *guelder* 2-thirds of a dollar 2*s.* 4*d.* *grosch* 1*d.* three farthings.

Ireland. In Ireland, before the union, accounts were kept in pounds, shillings and pence, as in Britain, and the British coins were current, but at different rates, viz. a guinea passed for 22s. 9d. Irish, half-guinea for 11s. 4d. halfpenny, shilling for 1s. 1d. sixpence for 6d. halfpenny; that is, one hundred pounds sterling were equal to 108l. 6s. 8d. Irish.

Leghorn. Accounts are kept in lire or pennos of 20 soldi of 12 denari.—The coins are, pistole of 99 lire or pennos 15s. 6d. ducat of 7 and an half lire or pennos 5s. 2d. halfpenny, piastre of exchange 6 pennos 4s. 2d.

Leipsia. Accounts are kept by thalers of 24 gute-groschen, gute-groschen of 12 pfening.—A ryks-daler is worth 1 and an half thalers. The coins are, the ducat of two dollars specie, 9s. 4d. dollar 4s. 6d. gered or thaler 2s. 4d.—The dollar of specie is worth two thirds of dollar of accounts.

Naples. Accounts are kept in ducats of 40 earlin, carlin of 10 grain.—The coins are, of gold, the pistole vulum 15s. 4d. sterl.—Of silver, ducat, 3s. 4d. teston, 1s. 4d. tarin, 8d. paul, 6d. earlin, 4d.—Of copper, grain, 9-5ths, quattrin, 2-15ths.

Portugal. Accounts are kept here in the most simple manner imaginable: in reas, of which 1,000 are worth 5s. 6d. sterling.—Coins, gold, moidore equal 48,000 reas, or £1. 7s. sterling, patagão equal 600 reas, or 5s. 4½d.—Silver, equal 400 reas, or 2s. 3d. testoon equal 100 reas, or 6½d.—Copper, ventin equal 20 reas, or 1d 7-96, rea equal 27-400 of a penny.

Rome. Accounts are kept in scudi of 10 pabli;

paoli of 10 bojechi.—The coins are, of gold, the pistole, value 15s. sterling; sequin value 9s.—Of silver, the crown or piastre, value 5s. or 10 paoli, testoon 1s. 6d. julio 6d.—Of copper, bayoc three-farthings, quattrin 3-16.

Russia. Accounts are kept in roubles of 100 copeeks.—The coins are, the ducat, 9s. rouble, 4s. 6d. poltina 2s. 1d. grevina 5d. 1-5ths, copeek 27-16ths of a penny.

Savoy. Accounts are kept in lire of 20 soldi, soldi of 20 denari.—A lire is worth 1s. 3d.—The coins are, of gold, pistole of 18 lire, value 16s. 3d.—Of silver, ducatoon 5s. 3d. crown 4s. 6d. lire 1s. 3d. florin 9d. sol, three-farthings.—Of copper, quattrin 2-16ths.

Sicily. Accounts are kept in onze of 30 tari, tari of 20 grani.—The onze is worth 7s. 8d. sterling.—The coins are, of gold, the pistole 16s. 4d.—Of silver, the ducat 3s. 4d. florin 1s. 6d. 5-15ths, tarin 3d. 1-13th, carlin 1d. 7-13ths.—Of copper, ponti 8-38ths.

Spain. Accounts are kept in Spain various ways, but always in rials, of which there are four sorts. The rial vellon of 8 1-8th quartos of 34 maravedis of vellon; this is used in the interior commerce, and is the 20th part of a dollar, or 2d. 7-8ths sterling.—The rial of plate, provincial, of 17 quartos or 34 maravedis, and is sometimes called the rial of new plate, is just double the value of the other, 5d. 3-8ths.—The rial of old plate of 10 quartos and 32 marevedis, 8 of which equal a dollar, 6½d. sterling.—The rial of Mexican plate of 21-4 quartos, 34 maravedis Cellon, 8 of which rials make a dollar.—The coins of Spain, are the

piñole of gold worth about 16s. 2d. sterling, the dollar 3s. 7d. the old Seville or Mexican dollar worth about 4s. 6d.

Turkey. Accounts are kept in piastres or dollars of 10 mina or aspers,—The dollar is equal to 4s. sterl.—The coins are, the xeriff, worth 10s. sterling, caragmouch 5s. seloto 1s. ostic 6d. asper 3/5ths of a penny.

Venice. Accounts are kept in ducats of 24 grossi, grossi of 12 denare, or in leri, soldi, and denari.—The ducat-current is worth 3s. 5d. sterl.—A ducat of exchange is 4s. 4d. sterl.—The coins are, of gold, sequin at 9s. 2d.—Of silver, ducat 3s. 5d. testoon 1s. 6d. julio 6d. grossi 1½d.—Of copper, soldi, 1-3d.

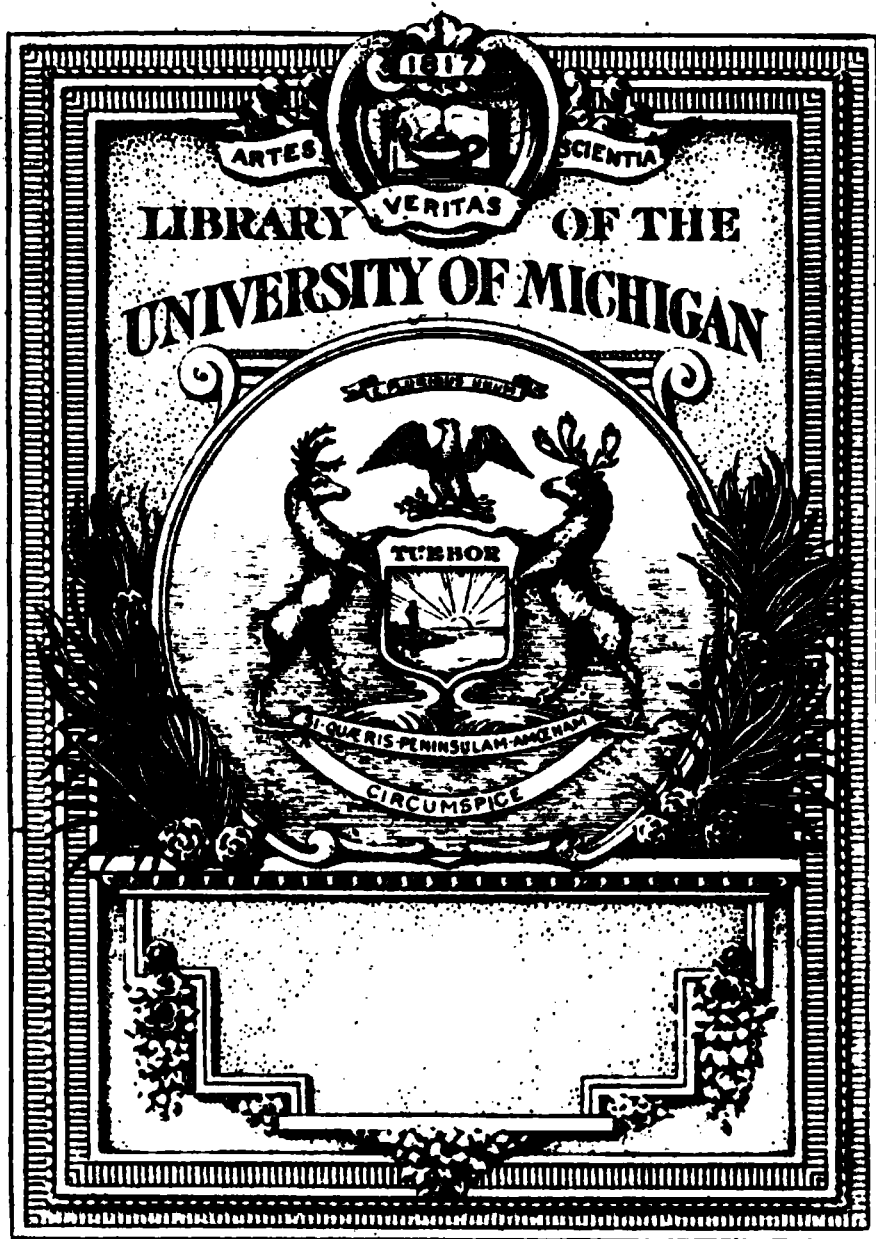
Vienna. Accounts are kept in florins or guelders of 61 kreutzers, kreutzers of 4 pfenings.—The florin is equal to 2s. 4d. sterl.—The coins are, the ducat of 4 florins, value 9s. 4d. dollar 4s. 6d. kreutzer 7-15ths of a penny.

COINING or Coinage is the art of making money ; and used formerly to be made with a hammer or mill. There were three machines chiefly in use, viz. the laminating engine :—the machine for making impressions on the edge of the coins, and the mill. The metal is first reduced to its proper thickness by the laminating engine, out of each lamina is cut as many pieces or planchets as it can contain : these then are brought to the machine that marks them on the edge, and when that operation is performed, they are taken to the mill to have the two faces stamped. The machinery now used in this country was invented by Messrs. Boulton and Watt ; it works the screw presses for cutting out the circular pieces of copper, and coins

both the edges and faces at the same time, with such superior excellence and cheapness of workmanship as will prevent clandestine imitations. By this machinery, worked with a steam engine and four boys, 30,000 pieces can be coined in an hour, and the machine acts at the same time as a register, and keeps an accurate account of the number of pieces struck.

♦ END OF VOL. I.





POCKET ENCYCLOPEDIA

OR A

DICTIONARY

OF

ARTS, SCIENCES,

AND

POLITE LITERATURE

COMPILED FROM THE BEST AUTHORITIES

BY

EDWARD AUGUSTUS KENDAL.

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TABLE I.—This Table consists of FRIGORIFIC MIXTURES, which are sufficient for all useful and philosophical purposes, in any part of the world, at any season.

FRIGORIFIC MIXTURES, *without Ice.*

MIXTURES.		Thermometer scale.	Deg. of cold.
	<i>parts</i>		
Muriate of ammonia...	5	From $+50^{\circ}$ to $+10^{\circ}$.	40
Nitrate of potash	5		
Water	16		
Muriate of ammonia...	5	From $+50^{\circ}$ to 4° .	46
Nitrate of potash	5		
Sulphate of soda	8		
Water	16		
Nitrate of ammonia ...	1	From $+50^{\circ}$ to $+4^{\circ}$.	46
Water	1		
Nitrate of ammonia ...	1	From $+50^{\circ}$ to -7° .	57
Carbonate of soda	1		
Water	1		
Sulphate of soda	3	From $+50^{\circ}$ to -3° .	53
Diluted nitric acid ...	2		
Sulphate of soda	6	From $+50^{\circ}$ to -10° .	60
Muriate of ammonia...	4		
Nitrate of potash	2		
Diluted nitric acid ...	4		
Sulphate of soda	6	From $+50^{\circ}$ to -14° .	64
Nitrate of ammonia ...	5		
Diluted nitric acid ...	4		
Phosphate of soda.....	9	From $+50^{\circ}$ to -18° .	68
Diluted nitric acid ..	4		
Phosphate of soda.....	9	From $+50^{\circ}$ to -21° .	71
Nitrate of ammonia ...	6		
Diluted nitric acid ...	4		
Sulphate of soda	8	From $+50^{\circ}$ to 0° .	50
Muriatic acid	5		
Sulphate of soda	5	From $+50^{\circ}$ to $+3^{\circ}$.	47
Diluted sulphuric acid	4		

TABLE II.—This Table consists of FRIGORIFIC MIXTURES, composed of ice, with chemical salts and acids.

FRIGORIFIC MIXTURES, *with Ice.*

MIXTURES.		Thermometer sinks.	Deg. of cold.
	<i>parts</i>		
Snow, or pounded ice .	2	From any Temperature to —5°	—
Muriate of soda.....	1		—
Snow, or pounded ice .	5		—
Muriate of soda.....	2		—
Muriate of ammonia...	1	From any Temperature to —12°	—
Snow, or pounded ice .	24		—
Muriate of soda.....	10		—
Muriate of ammonia...	5		—
Nitrate of potash	5	From any Temperature to —18°	—
Snow, or pounded ice...	12		—
Muriate of soda.....	5		—
Nitrate of ammonia...	5		—
Snow	3	From any Temperature to —25°	—
Diluted sulphuric acid	2		—
Snow	8		—
Muriatic acid.....	5		—
Snow	7	From + 32° to —23°	55
Diluted nitric acid.....	4		59
Snow	4		62
Muriate of lime.....	5		72
Snow	2	From + 32° to —40°	82
Christ. muriate of lime	3		82
Snow	3		83
Potash	4		83

TABLE III.—This Table consists of **FRIGORIFIC MIXTURES** selected from the foregoing tables, and *combined*, so as to *increase* or *extend* cold to the extremest degrees.

Combinations of FRIGORIFIC MIXTURES.

MIXTURES.		Thermometer sinks.	Deg. of cold.
	<i>parts</i>		
Phosphate of soda	5	From 0° to — 34°	34
Nitrate of ammonia ...	3		
Diluted nitric acid	4		
Phosphate of soda	3	From — 34° to — 50°	16
Nitrate of ammonia ...	2		
Diluted nitric acid	4		
Snow	5	From 0° to — 46°	46
Diluted nitric acid	2		
Snow	8	From — 10° to — 56°	46
Diluted sulphuric acid	3		
Diluted nitric acid	3		
Snow	1	From — 20° to — 60°	40
Diluted sulphuric acid	1		
Snow	3	From + 20° to — 48°	68
Muriate of lime	4		
Snow	3	From + 10° to — 54°	64
Muriate of lime	4		
Snow	2	From — 15° to — 68°	53
Muriate of lime	3		
Snow	1	From 0° to — 66°	66
Chryst. muriate of lime	2		
Snow	1	From — 40° to — 73°	39
Chryst. muriate of lime	3		
Snow	8	From — 68° to — 91°	23
Diluted sulphuric acid	10		

COLD; effects of. Different animals will endure different degrees of cold without injury. Some perish suddenly upon the approach of intense cold, such as insects of almost all kinds: others are only thrown into a state of lethargic insensibility, from which they revive again upon the return of warm weather, such are the hybernating animals, as land-tortoises, dor-mice, &c. Man is capable of bearing very wonderful degrees of heat and cold: from 212° of Fahrenheit's thermometer and even upwards, though this is the heat of boiling water; to 30° or 40° or even more below 0 or zero. The cold at Québec has sunk as low as -42° , and at Tornao M. Maupertius experienced a cold at -51° below the zero, and this is said to be nothing compared with what it has been known in some parts of Siberia; in which cases respiration is accompanied with prodigious pain, and seems to fill the lungs as with boiling liquid, while from the increased elasticity, of the air, the surrounding rocks and trees often split with reports like cannon.

COLEBROOKE DALE, claims a short notice on account of its various works: it is situated on the banks of the Severn between two vast hills which break into various forms, being all thickly covered and forming beautiful sheets of hanging woods. Here are the most considerable iron works in England: the noise of the forges, mills, &c. with all their vast machinery, the flames bursting from the furnaces, with the burning coal, and the smoke of the lime-kilns are altogether horribly sublime. Two beautiful bridges of cast-iron, give these scenes a still nearer resemblance to the ideas of romance. There is, also, in the dale, a remarkable

spring of fossil bar or petroleum, which has yielded a vast quantity of that substance.

COLEOPTERA: the first order of insects in Linnaeus' zoological system, which includes all those whose wings are guarded by a pair of strong, horny, exterior cases or coverings under which the wings are folded up when at rest. In common language these insects are called beetles. This order contains an immense number of insects.

COLLEGE, an assemblage or society of persons. In a more limited sense, a college is a public place, endowed with certain revenues, where the several parts of learning are taught, and where the students reside, under a regular discipline. An assemblage of several of these colleges is called a *university*. The erection of colleges is part of the royal prerogative, and not to be done but in the king's name. The establishment of colleges or universities forms a remarkable period in literary history. The schools in cathedrals and monasteries confined themselves chiefly to the teaching of grammar. There were only one or two masters employed in that charge; but in colleges, professors are appointed to teach all the branches of science. The first obscure mention of academical degrees in the university of Paris, from which the other universities of Europe have borrowed most of their customs and institutions, occurs, A. D. 1215.

COLLEGE of civilians, a college founded by Dr. Harvey, dean of the court of arches, for the professors of the civil law residing in London. Here, also, the courts of civil law are held.

COLLEGE, Gresham, founded by sir Thomas Gresh-

hall; and endowed for seven lecturers, who now receive £.100 per annum for reading, during term-time, on divinity, geometry, astronomy, music, law, physic, and rhetoric. The lecture-room is over the Royal Exchange of London, with the revenue of which building the institution is endowed.

COLLEGE of heralds, a corporation founded by Rich. III. subordinate to the earl-marshal of England, and to which, under that officer, belongs whatever relates to armorial bearings and pedigrees. Their house, usually called the *Heralds office*, where the court of the earl-marshal is held, is situate on Benet's-hill, near St. Paul's church, London. Scotland, also, has its *college of heralds*.

COLLEGE de propaganda fide, founded at Rome in 1622, by Gregory XV. consists of thirteen cardinals, two priests, and a secretary, and was designed for the propagation and maintenance of the Romish religion in all parts of the world.

COLLEGE, Sion, a college and hospital. A college for the clergy of London, who were incorporated in 1630, in pursuance of the will of Dr. White, under the name of the *President and fellows of Sion college*; and an hospital for ten poor men, and as many women.

COLLEGIATE churches, those that, without a bishop's see, have the ancient retinue of a bishop; such as the church of St. Peter's, Westminster. This was anciently a cathedral; but the revenues of the monastery being vested in the dean and chapter by act of parliament (1 Elizabeth), it became a collegiate church. In several causes, the styling this church *cathedral* instead of *collegiate*, has occasioned errors in the pleadings.

Collimation, line of, in a telescope, is that which passes through the tube, and cuts both the focus of the eye-glass and the centre of the object-glass.

Collision, in mechanics, is the meeting or mutual striking of two or more bodies, one of which, at least, is in motion. See **PERCUSSION**.

Colon, in grammar, a point or stop, marking the sense of the passage; but concerning the precise manner of using which, writers are by no means agreed. In some respects, too, it may be added, no precise rule can ever be laid down, much depending upon the peculiar construction of the sentence; the particular meaning that the writer would convey; and the degree of emphasis that he is desirous to impress. As far, however, as the positive use of stops can be prescribed, some observations will be found on this subject, under the article *Punctuation*.

Colonel, the commander in chief of a regiment, whether horse, foot, or dragons. A colonel may lay any officer under arrest, but must acquaint the general therewith. He is not allowed a guard; but has a centry from the quarter-guard.

Lieutenant Colonel, one who commands a regiment of guards whereof the king, prince, or other person of the first eminence, is colonel. He has a colonel's commission, and is usually a general officer.

Colonel lieutenant, the second officer in a regiment, at the head of the captains, and commander in the absence of the colonel.

Colony, a company of people transplanted into a remote province in order to cultivate it. There are three kinds of colonies, 1. Those serving to

case a country, where the people are become too numerous. 2. Those established by conquerors in the midst of vanquished nations to keep them in awe and obedience. 3. Colonies of Commerce, in which trade is the sole object of their establishment.

COLOSSIANS, Epistle to the, a canonical epistle of the New Testament, written at the time of that to the Ephesians towards the close of Paul's imprisonment at Rome, about the 63d year of the Christian era, and the ninth of the emperor Nero.

COLOSSUS, a statue of enormous or gigantic proportions. That particularly spoken of under this name, was an Apollo, of the height of 126 feet, erected at Rhodes; the workmanship of Chares, who devoted himself to this object during twelve years. It was of brass, and is said to have existed nearly fourteen centuries, before the period in which it fell by the shock of an earthquake. When the Saracens became possessed of Rhodes, they found the statue in a prostrate state, and sold it to a Jew, by whom 900 camels were laden with the materials. The base on which it stood was of a triangular figure; and its extremities were sustained by 60 pillars of marble. There was a winding staircase, by which persons ascended to its summit; and, in a looking-glass hung from its neck, Syria and the ships that went to Egypt were seen. This stupendous image is justly reckoned one of the *seven wonders* of human art. Among the antiquities of Rome, are seven famous Colossuses; of which two are statutes of Jupiter, two of Apollo, one of Nero, one of Domitian, and one of the Sun.

COLOUR, in physics, is stated to be "a property

inherent in light, by which, according to the various sizes of its parts, or from some other cause, it excites different vibrations on the optic nerve; which, propagated to the sensorium, affect the mind with different sensations." Every ray of light is supposed, by sir I. Newton, to be divided into seven colours, viz. *Red, orange, yellow, green, blue, indigo, violet*. Others contend that there are but three primary colours, viz. the *red, the green, and the violet*. See *OPTICS*.

COLOUR, musical scale of. It is found that if the spectrum of the sun's image formed by refracted light, let into a darkened room, be longitudinal divided by the points separating the different colours, into 360 parts, the

Red will occupy	-	-	-	-	-	-	45.
Orange	-	-	-	-	-	-	27.
Yellow	-	-	-	-	-	-	48.
Green	-	-	-	-	-	-	60.
Blue	-	-	-	-	-	-	60.
Indigo	-	-	-	-	-	-	40.
Violet	-	-	-	-	-	-	30.

COLOUR, in painting, is a word used both for the drugs or pigments, and for the tints they produce.

COLOURS, oil, these pigments that may be used in painting in oil. I. The principal colours used in painting flesh, and from which all the tints are made, are these: 1. *Flake-white, or fine white,* which should be ground with the finest poppy-oil. White is a friendly-working colour, and comes forward with yellows and reds, but retires with blues and greens. As it is the nature of all whites to sink into whatever ground they cover, they should always be laid on white. 2. *Ivory black,*

the best black, and a colour that sympathizes and mixes kindly with every other. It is a true shade for blue; and, with a little Indian-red, makes the best general shadow-colour. It is ground with linseed-oil, and used with drying-oil. Black is a cold, retiring colour. 8. Ultramarine, the finest blue in the world; but costly, and seldom used. It is a tender retiring colour, never glaring; beautiful for glazing, and used with poppy-oil. 4. Prussian, a very fine blue, and a good working-colour. It is ground with linseed-oil, though nut-oil is more proper. It should never be used in the flesh; but always in the green-tint, and the eyes. 5. Light-oker; a friendly-mixing colour, and of great use in the flesh: it is usually ground with linseed-oil, but nut-oil is better. All yellows are strengthened with reds, and weakened with blues and greens. 6. Light-red or light burnt-oker: thin, with white, produces the most perfect flesh-colour that can be made. It is a beautiful, clean, kind-working colour; but too strong for the white, and therefore will grow darker. It should be ground and used with nut-oil. 7. No vermilion, but what is made of the true native cinabar, should ever be used. It will not glaze; but is a fine colour when glazed itself. It is ground with linseed-oil, and should be used with drying oil. 8. Carmine, the most beautiful crimson, a middle colour between lake and vermilion, is a fine working colour, glazing delightfully. It should be ground with nut-oil, and used with drying-oil. 9. Lake; a tender, sympathizing, deep red; but of no strong body, and therefore to be strengthened with Indian-red. It is the best glazing-colour that can be used. It is

ground with linseed-oil; and used with drying-oil.

10. Indian-red, a strong, pleasant working-colour; but it will not glaze well; and, when mixed with white, it falls a little into the lead. It is ground and used as lake. 11. Brown-pink, a fine glazing-colour; but of no strong body: in the flesh it should never join, or mix with, the lights; because this colour and white antipathize, and mix of a warm, dirty hue: for which reason, also, their joinings should be blended with a cold middle-tint. In glazing of shadows, it should be laid before the colours that are to enrich it: it is one of the finishing colours, and therefore should never be used alone in the first painting. It is strengthened with burnt-umber, and weakened with terra-vert: ground with linseed-oil, and used with drying-oil. 12. Burnt-umber is a fine, warm brown, and an easy-working, strong colour, it is of great use in the hair, and mixes charmingly with the warm shade.

II. The principal tints that are absolutely necessary for painting flesh, all of which are made from the principal colours, are these: 1. Light-red tint is made of light-red and white: it is the most kind and best-conditioned of all colours for the general ground of the flesh. With this, and the shade-tint, all the flesh should be made out, like *claro-obscuro*, or *mezzotinto*. It should also be remembered, that this colour will grow darker, because it is in its nature too strong for the white: wherefore it should be improved; that is, some vermilion and white mixed with it, in proportion to the fairness of the complexion. 2. Vermilion-tint is vermilion and white, mixed to the middle-tint; it is the most mil-

light, pale-red, and green particularly well with the white, light, and yellow tints. 3. Carmine-tint, is carmine and white, mixed to a middle-tint, and the most beautiful red that can be used for the cheeks and lips: it is one of the finishing colours, and should never be used in the first painting, but laid upon the finishing colours, without mixing. 4. Rose-tint is made of the red-shade, and white, mixed to a middle degree, or lighter. It is one of the cleanest and most delicate tints that can be used in the flesh, for clearing up the heavy, dirty colours; and, in changing, it sympathizes and mixes kindly. 5. Yellow-tint is often made of Naples-yellow and white: but others use light-oker, which is a good working colour. It is to be remembered, that oker is too strong for the white, and, therefore, a little allowance should be made in using it. It follows the light-red tints, and should always be laid before the blues. If too much of it is laid, the ground it has been laid on may be recovered with the light-red tints. 6. Blue tint is made of ultramarine, or prussian, and white, mixed to a lightish azure: it is a pleasant working colour: and with it should be blended the gradations. It follows the yellows, and with them makes the greens; and with red, produces the purples. No colour is so proper for blending down, or softening the lights into keeping. 7. Lead-tint is made of ivory-black and fine white, mixed to a middle degree: it is a fine retiring colour, and therefore is of great use in the gradations, and in the eyes. 8. Green-tint is made of prussian, light oker, and white. This colour will dirt the lights, and should be laid sparingly in the middle-tints: it is most used in the red shadows,

the eight principal tints are made, as follows: 1. pearl, of black, white, and a little indian-red; 2. lead, of black and white, mixed to a dark lead colour; 3. yellow, of brown-oker and white; 4. olive, of light oker, prussian, and white; 5. flesh, of indian-red and white, mixed to a middle tint; 6. murrey, of indian-red, white, and a little black, mixed to a kind of purple, of a middle tint; 7. stone, of white, umber, black, and indian-red; 8. dark-shade, of black and indian-red, only. Here, the lead-tint serves for the blues; the flesh-tint mixes agreeably with the lead; and the murrey is a very good blending colour, and of great use where the olive is too strong. The umber, white, and dark-shade, will produce a fine variety of stone-colours: the dark-shade and umber, used plentifully with drying oil, make a charming warm shadow-colour. All the colours should be laid with drying oil only, because they mix and set the better with the softener.

COLOURS, Water, those that are used in painting with gum-water, or size, of which such as are resinous, or gummy, are not miscible with oil.

COLOURS of plants. The primitive colours, and their intermediate shades and gradations, are enumerated by botanists, as follows:

English.
Water-colour.

WHITE.

Lead-colour.

BLACK.

Brown.

Pitch-black.

Latin.
Hyalinus.

Cinereus.

NIGER.

Fuscus

Ater.

COLOURS.

27

English.	Latin.
YELLOW.	LUTEUS.
Straw-colour.	Flavus.
Flame-colour.	Rubrus.
Iron, or rust-colour.	Gilvus.
RED.	
Flesh-colour.	Incarnatus.
Scarlet.	Garcinea.
PURPLE.	
Violet-colour.	Ceruleo-purpurea.
BLUE.	CERULEUS.
GREEN.	

Linnæus has laid down the following general positions on the indications of colour with respect to the virtues of vegetables. A yellow-colour commonly indicates a bitter taste; as in gentian, aloe,celandine, and turmeric. Red, an acid or sour taste; as in cranberries, barberries, currants, raspberries, mulberries, cherries, the fruit of the rose, sea-buckthorn, and service-tree. Herbs that turn red toward autumn, have likewise a sour taste; as sorrel, wood-sorrel, and bloody-dock. Green indicates a crude alkaline taste, as in leaves and unripe fruits. A pale colour denotes an insipid taste, as in endive, asparagus, and lettuce. White promises a sweet and luscious taste; as in white currants and plums, sweet apples, &c. Lastly, black indicates a harsh, nauseous, disagreeable taste; as in the berries of deadly-nightshade, myrtle-leaved sumach, herb-christopher, and others; many of which are not only unpleasant to the taste, but pernicious and deadly in their effects.

COLOURS, in heraldry, are red, blue, black, green, and purple; which the heralds call *gules*, *azure*,

SABLE, VERT, and PURPURE. Tawny or tawny, and sanguine, are not so common. The yellow and white, called *or* and *argent*, are metals, not colours. The metals and colours are sometimes expressed in blazon by the names of precious stones, and sometimes by those of planets or stars.

COLOURS, in military affairs, include the banners, flags, ensigns, &c. of all kinds, borne in the army or fleet.

COLOURS in the Latin and Greek churches. There are five admitted into the Latin church, viz. the *white* for the mysteries of Christ, the feasts of the virgin, angels, saints, and confessors: the *red* for the solemnity of the holy sacraments, the feasts of the apostles, &c. ; the *green* for the time between Pentecost and Advent; the *violet* in Advent and Christmas, and in votive masses in time of war, and the *black* for the dead and the ceremonies belonging thereto. In the Greek church, the use of colours is nearly abolished; the red was the colour for Christmas and the dead, as black is among us.

COLUBER, the viper, in natural history. Of this genus, there are 175 species. The *coluber ferus* is found in most parts of Europe; it lives in woods and thickets, and, in breeding time, in the open fields: it is poisonous, but not deadly; it grows to a foot and an half long. The flesh was formerly used in medicine as a restorative. The poisonous matter discharged is a real gum, and perhaps the only gum actually produced and secreted by animals of any kind. Olive oil is the most successful application to the bite of a viper. Sucking the wound and throwing out the saliva, is said to be a means of withdrawing part of the venom, and it is

doubtful whether the poison be capable of producing any injury to the system when received into the mouth and stomach, unless the mouth, &c. be sore or ulcerated at the time. The viper is viviparous, that is, produces her young alive; and, it is asserted, that the female in case of sudden surprize or danger, opens her mouth and admits her young down her throat, till the danger is passed by. The coluber *cerastes* is found in Arabia and Africa, and is probably the asp employed by Cleopatra. This animal springs suddenly to a considerable distance, and bites, without the least provocation, those who approach it. The inhabitants are said to have a preparation of herbs with which they arm themselves against the bite. The coluber *naja*, or hooded snake, is every where exhibited publicly as a show; it is taught to dance to the sound of musical instruments. The Indian jugglers, who thus exhibit the animal, first deprive it of its fangs, to secure themselves and the spectators from injury. See Plate Nat. Hist. Figs. 7 and 8.

COLUMN. See ARCHITECTURE.

COLURES, in astronomy, two great circles supposed to intersect each other at right angles in the poles of the world, and to pass through the solstitial and equinoctial points of the ecliptic. They are hence called the solstitial and equinoctial colures.

COMBINATION, in chemistry, denotes the intimate union of two or more bodies of different natures, from which a new compound results, differing in its nature from either of the constituents. Thus, an acid united with an alkali, gives a neutral salt, and furnishes a good instance of combination. Sulphur

vapour appears to surround it, in the form of a border of hair. From this last phenomenon the word *comet* is derived: *com*, *come* "hair." Comets, notwithstanding, have been seen without either tail, beard, or coma, and whose discs were as clear, round, and well defined, as that of Jupiter. See SOLAR SYSTEM.

COMMA, a point or character marked thus (,) serving to denote a short stop in a sentence, and to divide the members of a period.

COMEDY, has been divided into three kinds, according to the ends which it proposes. By portraying vice, it renders it contemptible, as tragedy renders it odious: this is *characteristic comedy*. When men are represented as the sport of fortune, it is called *incidental comedy*. When the domestic virtues are drawn in amiable colours, and in situations where misfortune renders them interesting, it may be termed *sentimental comedy*. The *first* kind is the most useful to manners; the strongest, the most difficult, and the most rare: the *second* is the most successful and popular: the *third* excites a deeper interest, because the examples it holds forth affect us more nearly. There is also a style of comedy superior to these which unites the characteristic with the sentimental: such is the "School for Scandal."

COMMENDAM. See *Benefice in Commendam*.

COMMERCE, the exchange of one thing for another, is usually understood to mean that trade which takes place between separate nations, and is conducted by a superior class of traders, styled merchants. In a philosophical point of view, much

has been said for and against this great business of civilized countries. Narrow-minded moralists expatiate largely upon the evils with which it fills society. They dwell with a pleasure that shall not easily be called malicious, upon the thought that, at some former period, "Tea, coffee, and chocolate, were never tasted, except in great or rich families: but, now, the articles of tea and sugar are in common use; we send to the East and West Indies to furnish our poor with breakfasts! The wives of day-labourers, and the very almshouse-women, drink tea twice a day!"—and a more rational complaint was made by an Indian of Louisiana, when he said that, in his country, the young men overworked themselves to procure baubles for their wives, which Europeans had introduced. That luxury, the offspring of commerce, is a colossal monster, who, from his cradle upward, spreads social disorder and individual wretchedness, is a fact not less true than serious; and, did any thing the world exhibits, authorize us to believe that human life was intended to keep that unagitated course, which it is one disposition of the mind to desire, we might load it with unqualified execration; but, since man appears to be ignately active, and in all situations exposed to evil, we may survey, with a less heated imagination, activity of this particular kind, and evil of this particular form. To commerce, with all its mischiefs, with all its crimes, committed upon every shore, its depopulation of fields, and corruption of cities, to commerce we must attribute that growing intimacy between the members of the human race from which great benefits have redounded, and greater still may spring.

Commerce, on the whole, is highly favourable to the intellectual part of man, and, perhaps, as injurious to the animal: it multiplies his ideas, and his wants; 'brings riches to nations, and poverty to individuals, making the rich poor, and the poor, "poor indeed." In nations under these circumstances, it has been justly observed, every man that does not turn his talents to account, will find himself left behind in the universal emulation. Commerce is divided into commerce by land, and that by sea: inland or domestic, and foreign; and by wholesale and retail. The king is arbiter of domestic commerce, since it pertains to his prerogative to establish public marts, as markets and fairs, to regulate weights and measures, and to give money, which is the universal medium of commerce, authority and currency. A great part of the foreign commerce of England is now carried on by collective companies, some incorporated by the King's Charter with an exclusive privilege, as the East India company; others only private associations, as the Turkey and Hamburg companies.

The total official value of all the imports and exports of Great Britain for three years ending on the fifth of January 1808 is as follows:

Year ending	Imports.	Exports.
5th. Jan. 1806	£. 30,344,628	£. 34,954,845
1807	28,835,907	36,527,187
1808	29,153,101	34,586,045

Commission of Bankruptcy, is that issued by the Lord Chancellor, on persons becoming bankrupts within any of the statutes, and directed to any of the commissioners, who are appointed to examine into it.

COMMISSION.

and to assign the bankrupt's lands and effects, for the satisfaction of the creditors. The proceedings relate either to the bankrupt himself; or his property. In the former case a petition is presented to the lord chancellor by one creditor to the amount of 100*l.* or by two to the amount of 150*l.* or by three or more to the amount of 200*l.* in consequence of which, he grants a commission to certain persons denominated commissioners of bankrupts. The petitioners are bound in a security of 200*l.* to make the party amends, in case they do not prove him a bankrupt: and if they receive any of the bankrupt's money or effects, as a recompense for suing out the commission, so as to obtain more than their due proportion of his estate, they forfeit the same, together with the whole debt.

Assignees are chosen, and creditors called upon to prove their debts, and the bankrupt, at the third meeting of the creditors, is obliged to surrender all his property into the hands of the assignees, and if he conceal any to the amount of 20*l.* or upwards, he is liable to the punishment of death, and his effects are then to be divided among his creditors. But if he make a true discovery of all his effects, and has acted to the satisfaction of his creditors, and they, or four fifths of them, in number and value, will sign a certificate to that purport, the commissioners are to authenticate the same, and transmit it to the chancellor, who grants his certificate to the bankrupt, and he is then entitled to a certain allowance out of his effects, in proportion to the dividend paid. In consequence of such certificate, he is discharged from every debt owing by him at the time of his bankruptcy. The assignees are

bound to make a dividend within 12 months, and a second or final one within 18 months after the commission issued.

COMMITMENT, is the sending a person to prison by warrant or order, either for a crime or contumacy. If for a crime, the warrant must be discharged according to law; but for contumacy, it remains in force until he comply and perform the thing required. The commitment should be in writing, otherwise by the "*Habeas Corpus*" act; the prisoner may be admitted to bail whatever his offence may have been.

COMMITTEES of parliament, a certain number of members appointed by the house to proceed on some specific business. The whole house frequently resolves itself into a committee, in which case, each member has a right to speak as often as he pleases. When the house is not in committee, each gives his opinion regularly, and is only allowed to speak once, unless to explain himself.

COMMODORE, corrupted from the Spanish word *comendador*, a general officer in the British marine, invested with the command of a detachment of ships of war, during the period of which he bears the rank of brigadier-general in the army, and is distinguished from the other ships of his squadron by a broad pennant at his foretop. The name is also given to the oldest captain in a fleet of merchantmen, who leads the van in time of war, and carries a light in his top, to keep the fleet together.

COMMON-LAW, or the *unwritten law*, thus called, says M. De Lolme, because not founded on any known act of the legislature. It receives its force

from immemorial custom; and, for the most part, derives its origin from acts of parliament made in the times that immediately followed the conquest, particularly those anterior to the time of Richard the First, the originals of which are lost. The principal objects settled by the common-law, are the rules of descent, the different methods of acquiring property, and the various forms required for rendering contracts valid; in all which points it differs, more or less, from the civil-law. Thus, by the common-law, lands descend to the eldest son, to the exclusion of all his brothers and sisters; whereas, by the civil-law, they are equally divided between all the children: by the common-law, property is transferred by writing; but, by the civil-law, *tradition*, or actual delivery, is moreover requisite, &c. The source from which the decisions of the common-law are drawn, is what is called *præteritorum memoria euentorum*, and is found in the collection of judgments that have been passed from time immemorial, and which, as well as the proceedings relative to them, are carefully preserved under the title of *records*. In order that the principles established by such a series of judgments may be known, extracts from them are, from time to time, published under the name of *reports*; and these reports reach, by a regular series, so far back as the reign of Edward I. inclusively. Besides this collection, which is pretty voluminous, there are also some ancient authors of great authority among lawyers; such as Glanvil, who wrote under Henry II.—Bracton, who wrote under Henry III.—Fleta and Lyttleton. Among more modern authors, is sir Edward Coke, lord

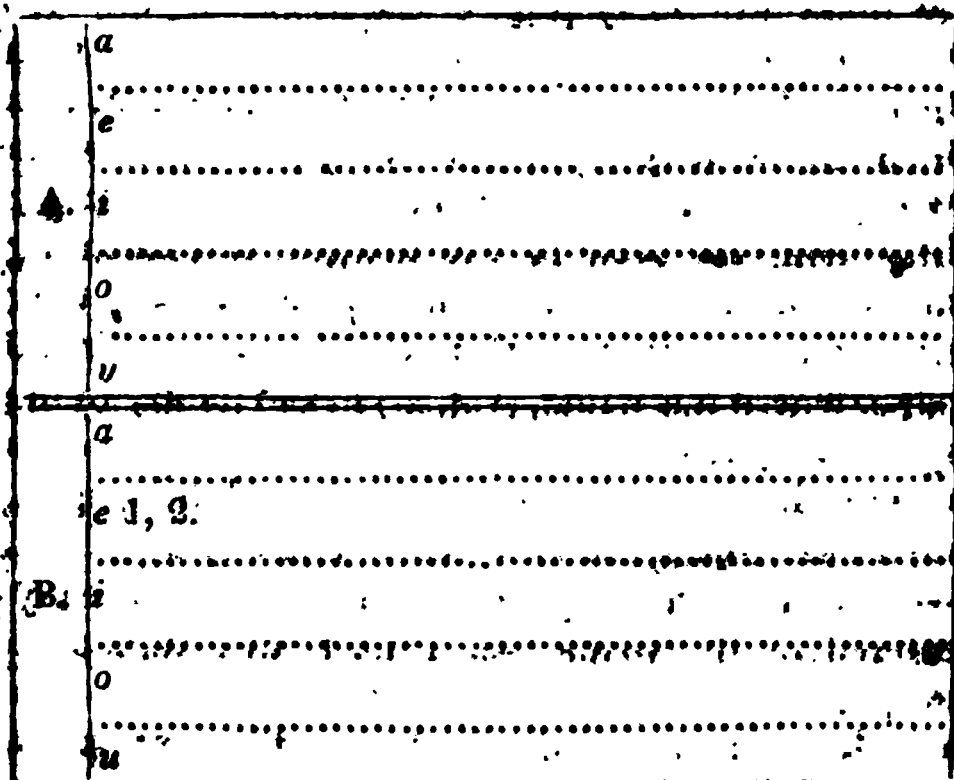
chief-justice of the king's-bench, under James I, who has written four books of Institutes, and is at present the oracle of the common law. This law, moreover, comprehends some particular customs, which are fragments of the ancient Saxon laws, escaped from the disaster of the conquest; such as that called *gavel-kind*, in the county of Kent, by which lands are equally divided between the sons; and that called *borough-English*, by which in some particular districts, lands descend to the youngest son.

COMMON Measure, is that which measures two or more things without a remainder. Thus of 8 and 12, a common measure is 2 and 4. The *greatest* common measure is the greatest number that can measure two other numbers; thus of 8 and 12 the greatest common measure is 4. To find the greatest common measure: "Divide the greater term by the less, then divide the divisor by the remainder if there be any, and so on continually till nothing remains, then is the last divisor the greatest measure sought."

COMMON-PLACE BOOK, a register of such thoughts and observations as occur to a person of reading or reflection. Mr. Locke's celebrated method of arranging a common-place book is explained as follows:

The first page is to serve as a kind of index to the whole, containing references to every place or matter therein; and in the commodious contrivance of this index, so as that it may admit of a sufficient copiousness without any confusion, all the secret of the scheme consists. To this end, the first page, as already mentioned, or for more room, the num-

per of pages necessary, are to be divided by parallel lines into 25 equal parts; whereof every fifth line is to be distinguished by its colour, or other circumstance. These lines are to be cut perpendicularly by others, drawn from top to bottom, and in the several spaces thereof the letters of the alphabet, capital and minuscule, duly written. The form of the lines and divisions, both horizontal and perpendicular, will be conceived from the following specimen; wherein what is to be done for every letter of the Alphabet, is shewn in the two first: A, B.



The index being thus formed, the book is ready for receiving insertions. In carrying them to the index, it is to be considered to what head the matter to be entered is most naturally referred, and

under which it would most commonly be sought. In this head, or word, regard is to be had to the initial letter, and the first vowel, which are the characteristic letters upon which all the use of the index depends. "Suppose, for instance, I would enter down a passage that refers to the word *beauty*. *B*, I consider, is the initial letter, and *e* the first vowel: then, looking upon the index for the partition *B*, and therein, for the line *e* (which is the place for all words whose first letter is *b*, and first vowel *e*; as *beauty*, *beneficence*, *bread*, *breeding*, *blanches*,) and, finding no numbers already down to direct me to any page of the book where words of this characteristic have been entered, I turn forward to the first blank page I find (which, in a fresh book, may be the second), and here write what I have occasion for on the head of *beauty*; beginning the head in the margin, and indenting all the other subservient lines that the head may stand out and show itself: this done, I enter the page, where it is wrote, (viz. 2.) in the index, in the space *B-e*; from which time the class *B-e* becomes wholly in possession of the 2d and 3d pages, which are consigned to words of this characteristic:—Had I found any page or number already entered in the space *B-e*, I must have turned to the page, and wrote my matter in what room was left therein: so, if after entering the passage on *beauty*, I should have occasion for *benevolence*, or the like, finding the number 2 already possessed of the space of this characteristic, I begin the passage on *benevolence* in the remainder of the page; which not containing the whole, I carry

It on to page 3, which is also for B-c; and add the number 3 in the index.

COMMON-PLEAS, one of the king's courts, formerly part of the *aula regis*; but as this latter court was bound by its institution to follow the person of the king, and private persons experienced great difficulties in obtaining relief from a court that was ambulatory, and always in motion, it was made one of the articles of the great charter that the court of common-pleas should thence forward be held in a fixed place; and since that time it has been seated at Westminster. It is composed of a lord chief-justice, with three other judges; and appeals from its judgments, usually called *writs of error*, are carried before the court of King's bench. All civil causes, as well real as personal, are triable in this court, according to the law of the land. In personal and mixed actions it has an equal jurisdiction with the king's bench; but can take no cognizance of pleas of the crown. Thus informations, in which the king is plaintiff, and the suit criminal, can only be allowed or *granted*, in the king's bench.

COMMONS, House of, the popular branch of the legislature and government of Great Britain, and the basis of the British constitution. The origin of this assembly ought, perhaps, to be attributed to the necessity under which the first Edward perceived himself of counteracting a powerful aristocracy. The feudal system had erected a band of petty monarchs from whom the crown was in perpetual danger. It is to the struggles of these men with regal authority, in the course of which, in order to strengthen their opposition, they were obliged to make a common cause with the people,

that M. De Lolme attributes the existence of English liberty. The same motive would equally induce the sovereign to pursue the same measures, and seek security against the nobles in the popular affection. It was natural, too, that he should endeavour, by every means within his reach, to give power to those whom he had thus disposed to be his friends. Accordingly, the illustrious Henry II. had commenced the gradual, but certain destruction of the Norman monster, in the vitals, by giving charters to several towns, from which the citizens claimed freedom and privileges, independent of any superior but himself; and in the distracted reign of Henry III. the earl of Leicester first introduced the Commons into the government, when, in order to strengthen himself with the power of the people against foreign combinations, he called a parliament; and, beside the usual members, ordered returns to be made of two knights from every shire, and deputies from the boroughs. This, however, was the act of a rebel: the first assemblage of the Commons, by the crown, took place in 1295. M. de Lolme, who seems inclined to show more grace to aristocracy than to monarchy, describes the event and its motives in the following words:

“Edward, continually engaged in wars, either against Scotland, or on the Continent, seeing moreover his demesnes considerably diminished, was frequently reduced to the most pressing necessities: but though, in consequence of the spirit of the times he frequently indulged himself in particular acts of injustice, yet he perceived that it was impossible to extend a general oppression over a body of nobles and a people, who knew so well how to unite in a

common cause. In order to raise subsidies, therefore, he was obliged to employ a new method, and to endeavour to obtain, through the consent of the people, what his predecessors had hitherto expected from their own power. The sheriffs were ordered to invite the towns and boroughs of different counties to send deputies to parliament ; and it is from this era that we are to date the legal origin of the house of commons."

This writer, who has always in view the establishment of a favourite and apparently well-founded position, that the *great power* of the English crown produced the union and consequent liberty of all orders of subjects, has taken care to leave his narrative unincumbered with collateral circumstances, unnecessary to that argument, but of much historical importance. Not only to the disturbances of the state, but to the new condition of the commonalty also, must be attributed the ascendancy they gained. It was agriculture and trade, the infant efforts of which the charters of the boroughs had fostered, that broke the hereditary league, that first made freemen of slaves, and then made freemen the rivals of princes. Property, at the period of which we speak, had changed its owners. The croisades had stripped the gentry, and filled the coffers of artisans. In Italy, this property actually purchased charters ; in England, it is possible, it sometimes did the same : at any rate, it gave consideration, and rendered even unennobled blood respected and courted. In a word, the house of commons arose on the ruins of the feudal fabric, gained ground as that decayed, pressed on its weaker parts, and, finally, levelled it with the dust

M. de Lolme very justly represents the right of granting money to the crown as the point upon which the very existence of the commons depends ; and their total exclusion from all share in the executive power, as the security of the people that, in electing representatives, they do not create tyrants. The faithfulness with which, in consequence of that restraint, they have served their constituents, is evinced, he remarks, in the uniformity with which every public struggle in England has ended in the obtention of, not their personal aggrandisement, but popular advantage. It was thus during, and at the conclusion of, the wars of York and Lancaster, and at the accession of James I. when the reception of a new family was in some sort a revolution, and certain demands were insisted on. After the accession of Charles I. the first serious discontents terminated in the act called the *Petition of Right*, a paper that is still regarded as an accurate delineation of the rights of the people. Their subsequent assumptions he attributes to the loss of that balance which the crown should maintain, on the day in which the king gave up his power of dissolving his parliament ; that is, from the day in which the members of that assembly acquired an independent, personal, permanent authority : an authority which they soon began to turn against the people who had raised them to it. In support of the honourable character of this house, when acting under its proper constitution, he farther adduces the instance of the revolution of 1688, at which era, he observes, the political wonder again appeared—of a revolution terminated by a series of acts in which no interests but those of

the people were considered and provided for ; no clause, the most indirect, inserted, either to gratify the present ambition, or favour the future views, of those who were personally concerned in bringing those acts to a conclusion ;—the disinterested laws it has framed, among which he instances the famous (and most justly famous) *Habeas corpus* act, to which, says judge Blackstone, “ the oppression of an obscure individual gave rise ;” the jealousy and zeal with which it has watched the execution of the laws ; its resentment of the attack made on sir John Coventry ; the abridgement of its personal privileges ; and the infliction of justice on its own members.

In all cases of public offence, down to a simple breach of the peace, the members of the house of commons have no privilege whatever above the rest of the people : they may be committed to prison by any justice of the peace ; and are afterward dealt with in the same manner as any other subjects. With regard to civil matters, their only privilege is to be free from arrests during the session, and forty days before, and forty days after ; but they may always be sued, by process against their goods, for any just debt. They have also the small, and, as public men, very appropriate privilege of receiving all letters by the general-post free of expense, and franking their own to others, to the number of ten a day.

Though each member is elected by a distinct body of people, he is, from the moment of his election, the representative not of those particular persons only, like the States-General of the United Provinces, and the deputies of the Swiss Cantons,

but of the kingdom at large; and is to consider himself not merely as the organ through which his constituents may speak, but as one who having been intrusted with a general charge, is to perform it to the best of his judgment. In performance of this great function, his liberty of speech is bounded only by those rules of decency of which the house itself is the judge; and while, on the one hand, he is free to propose what laws he pleases, on the other, he is exposed, as a private man, to the operation of the laws he makes.

This assembly is composed of six hundred and fifty-eight members, returned for the several parts of the empire in the following proportion:

<i>England,</i>	<i>Memb. Total.</i>
40 counties, 2 each	80
25 cities (Ely none, London 4)	50
167 boroughs, 2 each	334
5 boroughs, 1 each	5
2 universities, 1 each	4
8 cinqueports, 2 each	16—489
<i>Wales,</i>	
12 counties, 1 each	12
12 boroughs (Pembroke 2, Merioneth none)	12— 24
<i>Scotland,</i>	
Counties	30
Cities and boroughs	15— 45
<i>Ireland</i>	100—100
Total number of representatives of the united kingdom	658

COMMONWEALTH, in a general sense, any form of government; in an absolute one, a republic. See **REPUBLIC**.

COMPANY, in a commercial sense, a society of merchants, mechanics, or other traders, joined together in a common interest. The mechanics of incorporated towns are thus erected into companies [See *Livery Companies*.] The term is also applied to large associations set on foot for purposes of commerce. When companies do not trade upon a joint stock, but are obliged to admit any person properly qualified, upon paying a certain fine, and agreeing to submit to the regulations of the company, each member trading upon his own stock, and at his own risk, they are called *regulated companies*; when they trade upon a joint stock, each member sharing in the common profit or loss, in proportion to his share in the stock, they are called *joint-stock companies*. *Regulated companies* are intirely similar to the corporations of trades, and are a sort of enlarged monopolies of the same kind. As no inhabitant of a town can exercise an incorporated trade without first obtaining his freedom in the corporation; so in most cases no subject of the state can lawfully carry on any branch of foreign trade for which a regulated company is established, without first becoming a member of that company. The regulated companies for foreign commerce, at present subsisting in the united kingdom, are the *Hamburg-company*, the *Russia-company*, the *East-land-company*, the *Turkey-company*, and the *African-company*.

COMPANY, *joint-stock*, differs essentially, not only from regulated companies; but also from private

copartneries. 1. In a private copartnery, each member may, upon proper warning, withdraw, and demand his share of the common stock, but he cannot introduce a member into the company; in a joint-stock company, his situation is the reverse: he cannot demand his share, but he may transfer it to another. The value of this share, moreover, is uncertain; being that which it will bring at market. 2. In a private copartnery, each partner is bound for the debts contracted by the company to the whole extent of his fortune; in a joint-stock company, on the contrary, each partner is bound only to the extent of his share. The trade of a joint-stock company is always managed by a court of directors. See *East-India company*, *South-sea company*, and *Hudson's-bay company*.

COMPANY, in military affairs, a small body of foot, consisting of from 50 to 100 privates, commanded by a captain, who has under him a lieutenant and ensign. A battalion contains, 9, 10, or 11 such companies, one of which is always of grenadiers. Companies not incorporated are called *irregulars*, or *independent companies*.

COMPARATIVE anatomy, otherwise called the anatomy of beasts, and sometimes zoöatomy, and named *comparative* in relation to that of the human body; a study which affords considerable advantages. 1. It conveys such knowledge of the different parts of animals as detects imposition in those authors that have delineated and described parts of brutes as belonging to the human body. 2. It interprets several passages in ancient writers in medicine who have reasoned from those descriptions. 3. It casts considerable light, sometimes by similarity,

and sometimes by contrast, on the functions of the human frame.

COMPASS, or *mariner's steering compass*, is an instrument used at sea to direct the course of ships, by ascertaining the situation of a given point, and thence enabling the seaman to pursue a line in any direction to or from it. The European compass is contained in a circular box of brass, and consists of the magnetic needle, and a card marked with the 32 points, so fixed as to turn freely, and, together with the pin in the centre, yield to the motion of the vessel. In the centre of the needle is fixed a brass conical socket or cup, by means of which, the card hanging on the pin turns freely round the centre. The top of the box is covered with a glass, that the card's motion may not be disturbed by the wind. The whole is inclosed in a box of wood, where it is suspended by brass hoops, or gimbals, to preserve the card in an horizontal position. The utility of this instrument results from the magnetic virtue of the needle, through which it constantly places itself in a direct line from pole to pole ; a small declination peculiar to various parts of the world, excepted. The compass appears to have been first known about the thirteenth century ; but whether it was then discovered by a Neapolitan, a Frenchman, or an Englishman, or brought from China by a Venetian, is not wholly agreed. From some particulars mentioned in the account of the late British embassy to Pekin, it seems reasonable to conclude that, at least, the Chinese did not receive this contrivance from Europeans. 1. The loadstone and its maritime use appears to have been anciently known to that people, because, in a figure of Nep-

tune, it is placed in one of the hands of the god, as we place a trident ; 2. The Chinese pilots speak of the needle as pointing to the South pole, and Europeans, as pointing to the North. Both these expressions are equally just: but it commonly happens that when any thing of importance is borrowed from one nation by another, all the little attendant circumstances are taken with it. This latter argument equally maintains, with whatever conclusiveness it possesses, the originality of the European compass : Mr. Barrow, however a gentleman who attended the embassy, has made some observation from which it appears, that that of the Chinese is the more perfect of the two. He describes a sort of bandage of copper, by means of which the declination or variation of the needle is prevented. See MAGNETISM.

COMPASS *Azimuth*, an instrument used for correcting the mariner's compass, or at least, for ascertaining its variation, by finding the sun's magnetic azimuth or altitude. See *Azimuth*, and *Variation of the needle*.

COMPASSION is that species of affection which is excited either by the actual distress of its object, or by some impending calamity which appears inevitable. Compassion is always connected with a desire to relieve, and will always prompt to vigorous exertions wherever there is a possibility of success ; unless some important considerations should render the exertions improper or unjust. Compassion has no necessary connection with the character of the object. Its distress is a sufficient excitement.

COMPENSATION is a contrivance in a pendulum

clock, by means of which, while the expansion from increase of temperature depresses the centre of gravity of some of the vibrating parts, other parts are made to ascend nearer the centre of suspension, or to draw up the pendulum, so as to preserve the centre of oscillation of the compound pendulum at an invariable distance, and in consequence to keep all the vibrations to the same time. Compensation balance in a watch is a contrivance by means of which the errors occasioned by the variation of temperature may be corrected by varying the diameter of the balances.

COMPLEMENT of Life, a term used in the doctrine of annuities by De-Moivre, who denotes by it the number of years which a given life wants of 86, this being taken as the utmost probable extent of life. Thus to a person aged 20 the complement of life is 66: to a person aged 40 the complement of life is 46. Upon this mode half the complement of life is that which persons not very young, nor very old, may expect to enjoy, thus to a person of 20 the expectation of life is $\frac{66}{2} = 33$ years, and to persons of 30 and 40, the expectation of it will be $\frac{56}{2}$ and $\frac{46}{2} = 28$ and 23. To find how long a person of a given age may expect to live; that is, the number of years which persons of this age, taking them, one with another, will actually enjoy, and may be considered as sure of enjoying, those who live beyond that period enjoying as much more time, in proportion to their number, as those who fall short of it enjoy less. Rule. "Take the given

age from 86 and divide the remainder by 2." Life annuities and the expectation of life are not calculated in this way now, but from tables of real observations, nevertheless, the rule just mentioned agrees nearly or within a few months with the deductions taken from such tables, and may always serve in rough calculations.

COMPLEMENT, in astronomy, the distance of a star from the zenith, or the arch comprehended between the place of the star above the horizon and the zenith.

COMPLEMENT, in geometry, is what remains of a quadrant of a circle, or of 90° after any arch is taken away.

COMPLEMENTS of a parallelogram, are the two smaller parallelograms made by drawing two right lines through the point of a diagonal and parallel to the sides of the parallelogram.

COMPLEXION, among physicians, the temperament, habitude, and natural disposition of the body; but, in general use, the word means the colour of the skin. Dr. Hunter has given the following view of the different complexions observable among mankind :

Black.

Africans under the line,
Inhabitants of New Guinea,
Inhabitants of New Holland.

Swarthy.

Moors in the north of Africa.
Hottentots in the South of
Africa.

Copper-coloured. East Indians.

Red-coloured. Americans.

Brown coloured. Tartars.

Persians,

	Arabs,
	Africans on the coast of the Mediterranean,
	Chinese.
<i>Brownish.</i>	<i>Inhabitants of the South of Europe,</i>
	Sicilians,
	Abyssinians,
	Spaniards,
	Turks ; <i>and likewise</i>
	Samoides <i>and</i>
	Laplanders.
<i>White.</i>	<i>Most of the European nations ;</i>
	<i>also the</i>
	Georgians, <i>and</i>
	Inhabitants of the islands of the Pacific Ocean.

COMPOSITE order. See **ARCHITECTURE.**

COMPOSITION of motion, is an assemblage of several directions of motion, resulting from several powers acting in different, though not opposite directions. See **MECHANICS.**

COMPOST, in agriculture, an artificial manure, contrived with a view to this advantage: that, cheaper and less bulky than the quantity of dung required for an equal extent of soil, it shall yet produce equal effects.

COMPOUND Interest, see **INTEREST.**

CONCENTRATION, the act of increasing the strength of fluids, either by evaporating the water with which spirits or acids are combined, or by exposing them to severe frost, when the water will be frozen and the acid or spirits will be found in the middle of the ice.

CON

circle for its base, and its sides are formed lines drawn from the circumference of the point at top being the vertex or apex of

. Or a cone is a solid figure whose base is a circle, and which is produced by the entire revolution of a right angled triangle about its perpendicular side. See MENSURATION.

CONVA, see BOTANY.

CONFESSION, in the Romish church, the act of confessing crimes and errors of conduct to a priest, or to a private, to the end that due reprehension may be suffered, and pardon obtained. By the law, the priest who reveals what has been confessed to him, from anger, hatred, or even fear, is to be degraded.

CONFESSOR, an inferior saint of the Roman church, one who has resolutely stood forward to confess or avow his faith, and endured torture, or martyrdom for its sake.

CONFESSOR, a priest, in the Roman church, who is authorized to receive confessions and grant absolu-

tion *d'office*, see Bishop.

CONGELATION, may be defined the transition of a fluid to a solid state, in consequence of an abatement of heat: thus metals, oil, water, &c. are congealed when they pass from a fluid into a solid state. With regard to fluids, congelation and congelation mean the same thing. Water congelates at 32°, and there are few liquids that will not congelate, if the temperature be brought sufficiently low; the only difficulty is to obtain a temperature low enough to produce the effect; hence it has been inferred that congelation is the consequence of caloric. See FLUIDITY.

CONGREGATIONALISTS, in church history, a sect of Protestants who reject all church government, except that of a single congregation. In other matters, they agree with the Presbyterians. See **PRESBYTERIANS**.

CONIC-SECTIONS are such curve lines as are produced by the mutual intersections of a plane and the surface of a solid cone. In different positions of the plane there arise five different figures or sections, viz. the triangle; the circle; the ellipse; the parabola; and the hyperbola: the last three are peculiarly called Conic Sections, to investigate the properties of which is the business of Conics, and this depends on a knowledge of geometry plane and solid. It will be sufficient to our purpose to describe the lines and to shew how they are produced.

If the cutting plane pass through the vertex of the cone and any part of the base, the section so formed will be a triangle, as $V A B$, figure 1. Plate **CONIC SECTIONS**. But if the plane cut the cone parallel to the base, the section will be a circle as $A B D$ fig. 2.

In fig. 3 the section $A B C$ is an ellipse, and it is formed by cutting the cone obliquely through both sides making the angle $A x C$.

If the cone be cut by a plane parallel to one of its sides, as in fig. 4 the section $A D E$ is a parabola: here the angle $b A x$ is equal to $B a x$.

The section is an hyperbola when the cutting plane makes a greater angle with the base than the side of the cone makes; thus in fig. 5. the angle $A b x$ is greater than the angle $M B Z$: and if the plane $A D E$ be continued to cut the opposite cone, this latter section is called the opposite hyperbola to.

the former, $B e d$ is opposite to $A D E$. The vertices of any section are the points in which the cutting plane meets the opposite sides of the cone as A, B , in fig. 5, and 3, and A in fig. 4. Of course the ellipse and opposite hyperbolas have each two vertices, but the parabola has only one.

The axis, or transverse diameter of a conic section is the line $A B$ fig. 6 : $B B$, fig. 7. And $A b$ fig. 8. The centre C is the middle of the axis. In the ellipse the centre is within the curve, in the hyperbola it is without the curve, but in the parabola the centre is infinitely distant from the vertex.

A diameter is any right line drawn through the centre, and terminated on each side by the curve. All the diameters of the parabola are parallel to the axis, and infinitely long, because there is no termination to the line $A B$ fig. 8. The conjugate to any diameter is the line drawn through the centre and parallel to the tangent of the curve at the vertex of the diameter : thus $H I$, fig. 6, would be parallel to tangents drawn through A or B , and $G F$ is parallel to tangents drawn through D and E , of course $H I$ is conjugate to $A B$, and $G F$ is conjugate to $D E$.

An ordinate to a diameter is a line parallel to its conjugate and terminated by the diameter and curve : thus $D K$ and $E L$ are ordinates to the axis $A B$, fig. 6, 7, and 8. Ordinates are perpendicular to their axis.

An absciss is a part of any diameter contained between its vertex and an ordinate to it ; thus $A K$, $K B$ are abscisses to the ordinate $D K$: and $D N$, $N E$ are abscisses to the ordinate $M N$. In the

Fig. 1.



Fig. 2.

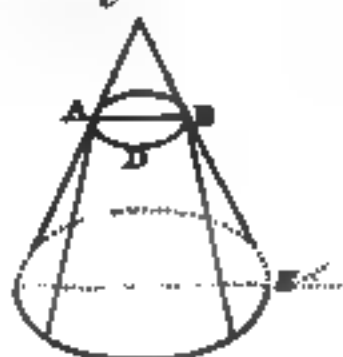


Fig. 3.

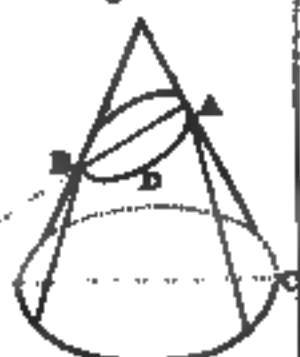


Fig.

Fig. 6.

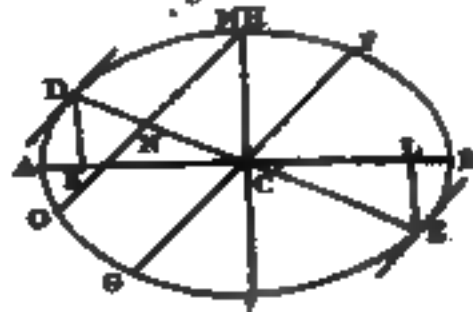
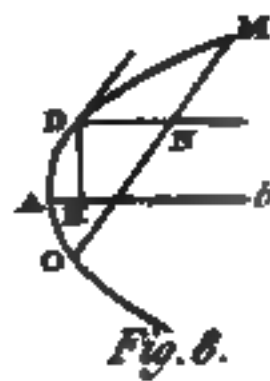
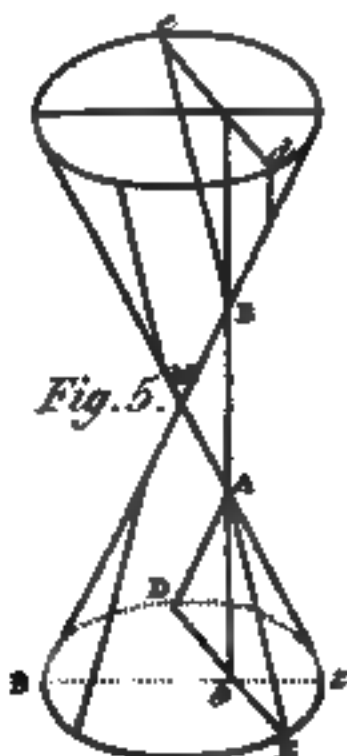
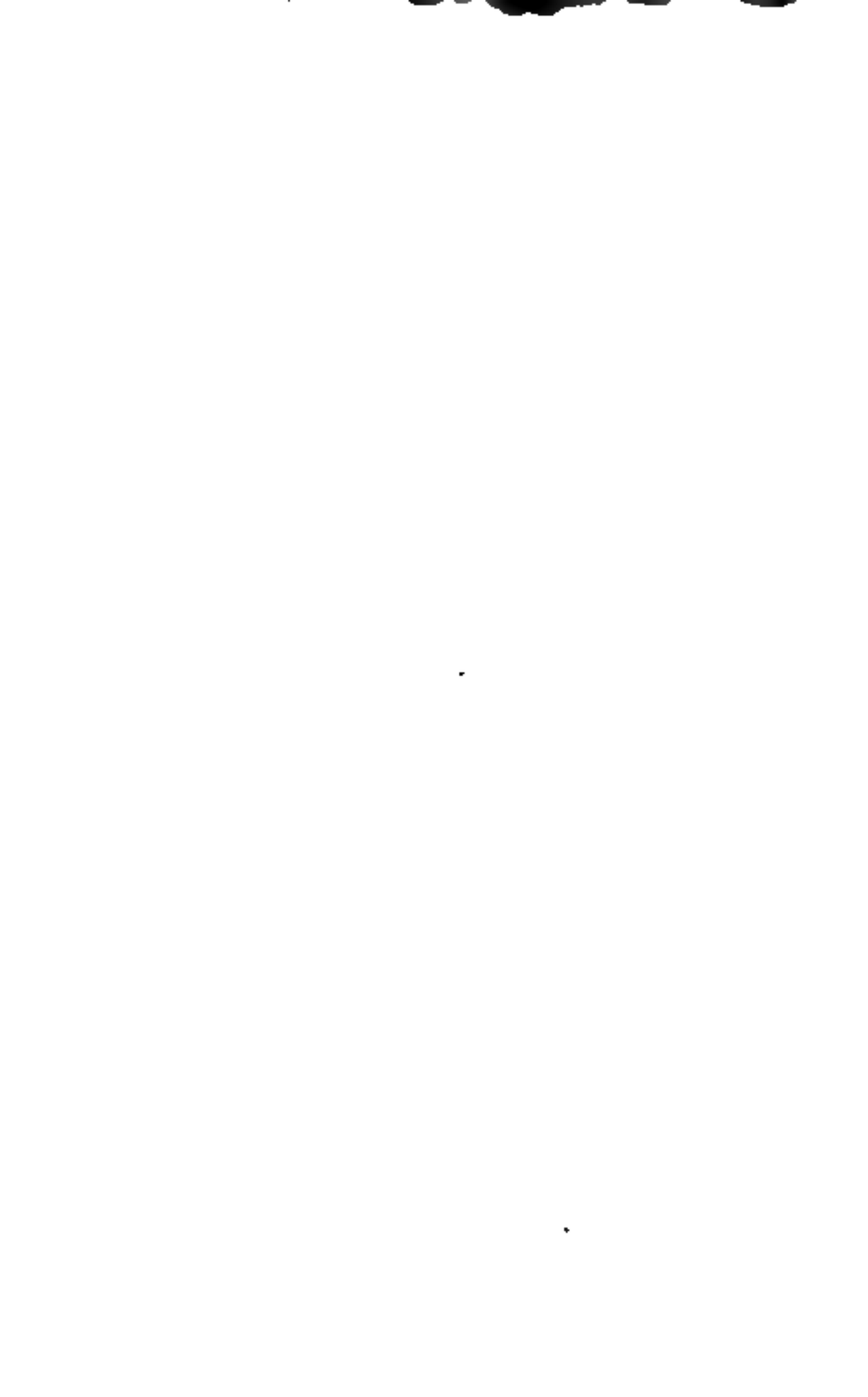


Fig. 7.



Copper engr.



ellipse and hyperbola every ordinate has two abscissas, in the parabola only one.

The parameter, or latus rectum of any diameter is a third proportional to that diameter and its conjugate, thus if the parameter be called p , then $AB : HI :: HI : p$. Fig. 6.

The focus is the point in the axis at which the ordinate is equal to half the parameter : the ellipse and hyperbola have two foci, the parabola but one.

There are three methods of investigating and demonstrating the various properties of the conic sections. The first is to consider them, as they really are, cut from the cone itself : by the second method the properties are deduced from arbitrary descriptions of the curves on plane surfaces, and the third is performed by algebraical equations. The doctrine of the Conic Sections is useful in the higher branches of geometry and astronomy.

CONNEXIONS, a game at cards, played by either three or four persons. If the former number, ten cards each are to be dealt ; if the latter only eight each, which are dealt in the same manner as at whist, and bear the same import, excepting that diamonds are here always trumps.

The "connexions" are formed as follows :

1st, by the two black aces.

2nd, ——— ace of spades and king of hearts.

3rd, ————— clubs and king of hearts.

For the first connexion two shillings are drawn from the pool ; for the second one : and for the third and the winner of the majority sixpence each. These sums suppose guineas staked ; but when silver is pooled only pence are drawn.

A trump played in any round where there is a

connexion wins the trice, otherwise it is gained by the player of the first card of connexion, and after a connexion any following player may trump without incurring a revoke, and also whatsoever suit may be led, the person holding a card of connexion is at liberty to play the same, but the others must if possible follow suit, unless one of them can answer the connexion, which should be done in preference.

No money can be drawn till the hands are finished, then the possessors of the connexions are to take first according to the precedence, and those having the majority of tricks take last. **PANTALOGIA.**

CONSANGUINITY, the relation which subsists between persons who are sprung from the same root. It terminates in the sixth or seventh degree, except in the succession to the crown, in which case it is continued to infinity. Marriage is prohibited by the church to the fourth degree of consanguinity inclusive.

CONSISTORY, an ecclesiastical court or assembly. That of Rome is the college of cardinals, or the pope's senate and council. In England, each archbishop and bishop has a consistory-court, held before his chancellor or commissary, see **ARCHBISHOP**.

CONSTABLE, in the civil policy of England, an officer under the magistrates for the preservation of the peace, whose duty, at present, principally consists in seizing and securing persons guilty of tumultuary offences. A modern

CONSTABLE-High, is chosen or appointed to preside over an hundred, or a franchise or liberty; but the title originally belonged to officers of great rank,

CONSTABLE-Lord High of England, a post long

since considered as too powerful to be committed to a subject, and never granted, since the attainder of Edward Stafford, duke of Buckingham, otherwise than temporarily ; as, to attend a coronation, or preside at a trial by combat.

CONSTABLE-*Lord High of Scotland*, an office which is hereditary in the family of Errol, had the keeping of the king's sword, the unlimited command of the army in the absence of the king, and certain judicial powers. There are also still existing in England and Wales, several

Constables of castles, as of the Tower of London, Dover, Windsor, and Caernarvon castles ; and these constables are governors.

CONSTELLATION, an assemblage or system of several stars, expressed or represented under the name and figure of some animal or other thing. The division of the starry heavens into constellations is very ancient, probably as old as astronomy itself. Modern astronomers divide the whole starry firmament into three parts, viz. 1. The constellations in the Zodiac. 2. Constellations north of the Zodiac, and 3. Constellations south of the Zodiac. The constellations in the Zodiac are Aries : Taurus : Gemini : Cancer : Leo : Virgo : Libra : Scorpio : Sagittarius : Capricornus : Aquarius : and Pisces : the names and order of these 12 signs may be easily remembered by the aid of the following lines ;

The ram, the bull, the heavenly twins,
And next the crab the lion shines,

The virgin and the scales,

The scorpion, archer, and sea-goat,

The man that holds the watering-pot,

And fish with glittering tails.

CONSTERNATION is a species of fear, and is a strong foreboding of tremendous evils which are likely to follow misfortunes that have already taken place. It may seize an individual, when surprized by the arrival of some dreadful disaster, or at the instant of his being made acquainted with the event, but it chiefly refers to alarms of a more extensive nature; to some general calamity which threatens evils beyond the power of calculation.

CONSTITUTION, in politics, a form or principle of government. Some difference of opinion is entertained concerning the respective advantages of written and unwritten constitutions: the first originating from events, and, frequently, never formally acknowledged; the second depending upon articles carefully drawn, and solemnly acceded to. On this subject, the observations of Mr. Adams, the late president of the United States, appear to be entitled to attention: 'A constitution,' says Mr. Paine, 'is not a thing in name only but in fact. It has not an ideal, but a real existence; and wherever it cannot be produced in a visible form, there is none.' Mr. Paine should have gone farther, and told us, whether like a deed, it must be written on paper or parchment, or whether it has a larger latitude, and may be engraved on stone, or carved in wood? From the tenour of his argument it should seem, that he had only the American constitutions in his mind; for, excepting them, I believe he would not find in all history a government which will come within his definition; and of course, there never was a people that had a constitution, previously to the year 1776. But the word, with an idea affixed to it, had been in use, and commonly

understood, for centuries before that period, and therefore Mr. Paine must, to suit his purpose, alter its acceptations, and in the warmth of his zeal for revolutions, endeavour to bring about a revolution in language also. When all the most illustrious whig writers in England have contended for the liberty of their country upon the principles of the English constitution; when the glorious congress of 1774 declared, that 'the inhabitants of the English colonies in North America were entitled to certain rights by the immutable laws of nature, *the principles of the English constitution* and the several charters or compacts,' they knew very well what they meant, and were perfectly understood by all mankind. Mr. Paine says, that 'a constitution is to a government, what the laws made afterward by that government are to a court of judicature:' but when the American States, by their constitution, expressly adopted *the whole body of the common law*, so far as it was applicable to their respective situations, did they adopt nothing at all, because that law cannot be produced in a visible form? No, the constitution of a country is not the paper or parchment upon which the compact is written; it is the system of fundamental laws, by which the people have consented to be governed, which is always supposed to be impressed upon the mind of every individual, and of which the written or printed copies are nothing more than the evidence."

Mr. Adams has farther illustrated this subject, in the following passage: "It is not absolutely essential to the existence of a constitution, that it should be producible 'in a visible form.' The period of time when the foundations of the present English

government were laid by the association of the people in 'their original character' cannot, indeed, be ascertained. Many of the laws which are in use to this day in Great Britain, and from thence have been adopted by the American republics, may be traced back to the remotest period of antiquity; and the origin even of the institution of juries, an institution so congenial to the genuine spirit of freedom, is lost in the obscurity of the fabulous ages. Many of the fundamental principles of the English constitution are known to have existed long before the invention of printing, and even before the inhabitants of Britain were acquainted with the use of letters, and it would therefore be an absurdity to require that the original articles should be produced 'in a visible form.' But *ex nihilo, nihil fit*; the very existence of these principles proves the formation of a social compact previously to that existence; and the spirit of liberty, which is their distinguishing characteristic, affords internal evidence that they did not originate in the merciless despotism of a conqueror, but in the free and unrestrained consent of a manly and generous people. It will not be said that an original compact was never formed, because it is not recorded in the page of history:—as well might it be pretended, that the pyramids of Egypt arose self-created from the earth, because the time of their erection and the names of their builders have been consigned to that oblivion in which all human labours are destined to be overwhelmed.

"In this sense, the British nation have a constitution, which was, for many years, the admiration of the world. It is composed of a venerable *system*.

of unwritten or customary laws, handed down from time immemorial, and sanctioned by the accumulated experience of ages ; and of a body of statutes enacted by an authority lawfully competent to that purpose. Mr. Paine is certainly mistaken, when he considers the British government as having originated in the conquest of William of Normandy. This principle of being governed by an oral, or traditional law, prevailed in England eleven hundred years before that invasion. It has continued to this day, and has been adopted by all the American States, and it is hoped they will never abolish a system so excellent, merely because it cannot be produced in a visible form. The constitution of Great Britain is a constitution of *principles*, not of *articles* ; and however frequently it may have been violated by tyrants, monarchical, aristocratical, or democratical, the people have always found it expedient to restore the original foundation, while, from time to time, they have been successful in improving and ornamenting the building."

CONSTITUTION, British. In this justly-celebrated form of government, power of every kind, and without limit, is vested in the united will of the crown and two houses of parliament : but though the concurrence of the throne is necessary to the measures of each, their functions are distinct ; and its perfection consists not only in the equipoise of power between these authorities, but in the strictness with which each is confined to its own boundaries. Under the heads *King, Parliament, House of Lords, House of Commons, &c.* some account is given of the rise, progress, establishment, and nature of that civil liberty which is the constitutional.

principle of the British Empire. The acute and animated author of the *Constitution of England*, to whom this book is in several instances indebted, has, in the following paragraphs, given a comprehensive picture of the whole. The subject is here viewed *a priori*; and this, in some cases, is a very useful point of view.

“If we could, for an instant, suppose that the English form of government, instead of having been the effect of a lucky concurrence of fortunate circumstances, had been established from a settled plan, by a man who had discovered beforehand and by reasoning all those advantages resulting from it which we now perceive from experience, and had undertaken to point them out to other men capable of judging of what he said to them, the following is, no doubt, the manner in which he would have spoken to them :

“Nothing is more chimerical,” he would have said, “than a state of either total equality or total liberty amongst mankind. In all societies of men; some power will necessarily arise. This power, after gradually becoming confined to a smaller number of persons, will, by a like necessity, at last fall into the hands of a single leader; and these two effects (of which you may see constant examples in history) flowing from the ambition of one part of mankind, and from the various affections and passions of the other, are absolutely unavoidable.

“Let us, therefore, admit this evil at once, since it is impossible to avoid it. Let us, of ourselves, establish a chief among us, since we must, some time or other, submit to one; we shall by this means effectually prevent the conflicts that would arise

among the competitors for that station : but let us, above all, establish him single ; lest, after successively raising himself on the ruins of his rivals, he should finally establish himself, whether we will or not, and through a train of the most disadvantageous events.

“ Let us even give him every thing we can possibly give without endangering our security. Let us call him our sovereign ; let us make him consider the state as being his own patrimony ; let us grant him, in short, such personal privileges as none of us can ever hope to rival him in, and we shall find that what we were at first inclined to consider as a great evil, will be in reality a source of advantages to the community—we shall be the better able to set bounds to that power which we shall have thus ascertained and fixed in one place : we shall have the more interested, the man, whom we shall have put in possession of so many advantages, in the faithful discharge of his duty ; and we shall have thus procured for each of us, a powerful protector at home, and for the whole community a defender against foreign enemies, superior to all possible temptation of betraying his country.

“ You may also have observed,” he would continue, “ that in all states there naturally arises around the person, or persons, who are invested with the public power, a class of men who, without having any actual share in that power, yet partake of its lustre ; who, pretending to be distinguished from the rest of the community, do, from that very circumstance, become distinguished from them : and this distinction, though only matter of opinion,

and at first thus surreptitiously obtained, yet becomes at last the source of very grievous effects.

“ Let us therefore regulate this evil, which we cannot entirely prevent. Let us establish the class of men who would otherwise grow up among us without our knowledge, and gradually acquire the most pernicious privileges: let us grant them distinctions that are visible and clearly ascertained; their nature will, by this means, be the better understood, and they will of course be much less likely to become dangerous. By this means also, we shall preclude all other persons from the hopes of usurping them. As to pretend to distinctions can thenceforward be no longer a title to obtain them, every one who shall not be expressly included in their number, must continue to confess himself one of the people; and, just as we said before let us choose ourselves one master that we may not have fifty, so, let us again say on this occasion, let us establish three hundred lords, that we may not have ten thousand nobles.

“ Besides, our pride will better reconcile itself to a superiority which it will no longer think of disputing. Nay, as they will themselves see us to be beforehand in acknowledging it, they will think themselves under no necessity of being insolent to furnish us a proof of it. Secure as to their privileges, all violent measures on their part for maintaining, and at last perhaps extending, them will be prevented: they will never combine together with any degree of vehemence, but when they really have cause to think themselves in danger: and by having made them indisputably great men, we shall

have a chance of often seeing them behave like modest and virtuous citizens.

“ In fine, by being united in a regular assembly; they will form an intermediate body in the state; that is to say, a very useful part of the government.

“ It is also necessary,” our lawgiver would farther add, “ that we, the people, should have an influence upon the government : it is necessary for our own security ; it is no less necessary for the security of the government itself. But experience must have taught you, at the same time, that a great body of men cannot act, without being, though they are not aware of it, the instruments of the designs of a small number of persons ; and that the power of the people is never any thing but the power of a few leaders, who, though it may be impossible to tell when, or how, have found means to secure to themselves the direction of its exercise.

“ Let us, therefore, be also beforehand with this other inconvenience. Let us effect openly what would, otherwise, take place in secret. Let us intrust our power, before it be taken from us by address. Those whom we shall have expressly made the depositaries of it, being freed from any anxious care about supporting themselves, will have no object but to render it useful. They will stand in awe of us the more, because they will know that they have not imposed upon us ; and instead of a small number of leaders who would imagine they derive their whole importance from their own dexterity, we shall have express and acknowledged representatives, who will be accountable to us for the evils of the state.

“ But above all, by forming our government of a small number of persons, we shall prevent any disorder that may take place in it, from ever becoming dangerously extensive. Nay, more; we shall render it capable of inestimable combinations and resources, which would be utterly impossible in that government of all, which never can be any thing but uproar and confusion.

“ In short, by expressly divesting ourselves of a power of which we should, at best, have only an apparent enjoyment, we shall be entitled to make conditions for ourselves: we shall insist that our liberty be augmented: we shall, above all, reserve to ourselves the right of watching and censuring that administration which will have been established only by our own consent. We shall the better see its defects, because we shall be only spectators of it: we shall correct them the better, because we shall be independent of it.”

CONSUL, in the Roman commonwealth, the title of the two chief magistrates, whose power was, in a certain degree, absolute, but who were chosen only for one year. The authority of the two consuls was equal: yet the Valerian law gave the right of priority to the elder, and the Julian law to him who had the greater number of children; and this was generally called *consul major*, or *prior*.

CONSUL, in commerce, an officer appointed to reside in foreign countries, to protect the interests of trade. He is to act as a common friend to such of his mercantile countrymen as visit his station. His house is distinguished by the arms of his government placed over the door.

CONSUL, *First*, an high office, established some

years since as the head of the government of France. It was to be held for ten years, and confer the power of proposing laws, of directing foreign affairs, and of controuling, or managing, the war-department.

CONTEMPT, the act of despising others ; scorn ; or the state of being despised ; vileness. Contempt directs its chief attention to the character and disposition, which are capable of committing unworthy and disgraceful actions. Its objects are radical baseness, and radical imbecility where it should not exist.

CONVENTICLE, in the modern acceptation, a word of contempt, applied by ignorant bigots to a religious assembly of any persuasion differing from that of the church of England. Originally, *conventicle* was the diminutive of *convent* ; and signified a party or faction of monks, leaguings for the election of an abbot.

CONVEYANCE, a deed or instrument that passes land, &c. from one person to another.

CONVEYANCER, one who professes to draw deeds, mortgages, and conveyances of estates. This is one of the most profitable branches of the law, especially when the business of a money-scrivener is super-added ; in which latter case, a conveyancer is employed to find estates to purchase, to lay out, and borrow money, and in these occupations he is paid by both the contracting parties, and draws the securities. This profession requires great knowledge of the law, and a solid and clear understanding ; for on conveyancing the security of property greatly depends.

CONVOCATION, an assembly of the clergy of Eng-

land, at present merely nominal. Its province is stated to be, the enactment of canon-law, subject to the licence of the king; and the examination and censuring of all heretical and schismatical books and persons; but from its judicial proceedings lies an appeal to the king in chancery, or his delegates. In 1665, the convocation then assembled surrendered to parliament the right of taxing the clergy; and ecclesiastical persons in return obtained the right of voting at elections: since which alteration, the convocation has usually been called and dissolved together with the parliaments; but prorogued from time to time through the whole period of its existence.

COOPER, a maker of casks. This hard-working business has several branches. Some casks are tight, for holding liquids, and others not so, for dry goods, package, and soap. The making of soap-casks is the lightest labour, and requires the least capital; that of small light casks is more laborious, and demands a larger fund; that of butts, hogsheads, and large vessels for brewing and other extensive purposes, stands, in both respects, the highest in the scale.

COPAL, improperly called gum-copal, a gum of the resinous kind, the concrete juice of a tree called *rus copallinum*, which grows in New-Spain. It is dissolved in linseed-oil by digestion, with a heat very little less than sufficient to boil or decompose the oil; and the solution, diluted with spirit of turpentine, forms a well-known, transparent varnish.

COPERNICAN system. See **SOLAR system**.

GOPHI, or **copts**, a name given to the jacobites, a

sect of christians in Egypt. The principal errors in regard to doctrine, of which they are accused by the Roman church, are, 1. The acknowledgement of seven sacraments. 2. The denial of the proceeding of the Holy-Spirit from the Son; 3. The allowance of three general councils of the church; 4. The allowance of one nature, will, and operation in Jesus Christ, after the union of the humanity with the godhead. In point of discipline, they ordain deacons of five years of age; and allow marriage in the second degree of affinity. The church-government of the jacobites is episcopal; and the sect appears to differ but little from the Greek-church; it has, however, a patriarch of its own. The other christians of Egypt are called *melchites*.

COPPER, the finest of the imperfect metals. It has obtained the name *Venus*, on account of its readiness to unite with several metallic substances. Native copper is found in Sumatra, it is picked up in loose masses, on the hills shattered by earthquakes, which are very prevalent in that island. The natives are ignorant of mining; but Mr. Macdonald supposes that its mountains contain inexhaustible stores of this mineral. On smelting it, a considerable portion of gold is found to be included in the ore. Paris-mountain, in the isle of Anglesea, is famous for its copper-works. A method of obtaining fine copper from springs that, according to common expression, turn iron into that metal, has been known for centuries in Germany, and, within these few years, practised in the united kingdom. The explanation of this circumstance is, that the iron is dissolved by the vitriolic acid of the springs in question, and the copper precipitated in

its metallic form in place of the iron. The present bishop of Llandaff relates that at the copper-mines at Arklow, in Ireland, one of the workmen having left an iron shovel in a stream that issues from the works, he found it, after having lain there some weeks, so incrustated with a coat of copper, that it was at first believed to be changed into that metal. The proprietors of the mines, in pursuance of the hint, made proper pits and receptacles for the water, and obtained, by means of soft iron bars put into them, such quantities of copper that the streams are now of equal value with the mines themselves. One ton of iron produces nearly two tons of copper-mud; and each ton of mud, when melted, sixteen hundred weight of copper: and the metal thus obtained sells for £10 a ton more than that fluxed from the ore. The lessees of the Paris mines, annually raise from six to seven thousand tons of saleable ore, and daily employ forty furnaces in smelting it. This ore contains a large proportion of sulphur, which must be separated by *roasting*, before it can be melted, or, technically speaking, *fluxed*. The inflammable chemical liquor, with part of the vitriolic acid it contains, are dispersed in the air by the force of the fire; while another part of the acid attacks and dissolves so much of the copper, that the water in which the *roasted* ore is washed, has yielded, in one year, iron being immersed, an hundred tons of fine copper. Copper is injurious to the animal system. See POISON.

.. COPPER-plate. See ENGRAVING.

.. COPPER-plate, printing. See PRINTING.

.. COPPERAS, is the sulphate of iron, and is commonly called green vitriol. If sulphuric acid be diluted

with water, and be poured upon iron, much effervescence will be seen; the metal will be dissolved, and the solution, when evaporated, will exhibit the sulphate of iron, or common copperas, which is a neutral salt in a very impure state. Copperas is the basis of many dyes: it gives a fine black, though it rather subjects the material to decay, unless used with extreme caution, the least excess occasioning the cloth, &c. to rot very soon. It seems that wool is more affected by it than felt, as is obvious from the greater duration of hats beyond what broad cloths, &c. exhibit when dyed black. Ink owes its rich blackness principally to the copperas which it contains; and our fine black leathers are equally indebted to its powerful qualities, that so firmly fix the colour on all occasions. Many servants are in the habit of cleansing their copper kitchen-utensils with green vitriol, which is extremely dangerous: the copperas is highly corrosive, and disengages a very large portion of the copper, which cannot be always removed, even when much pains are taken, the salt being buried under projecting rims, rivets, &c. We are apt to believe that many most painful and dangerous complaints have resulted from this, though probably they may have been assigned to other supposed causes.

Copy-hold, a sort of tenure of landed property, according to the custom of the manor, the holder of which is subject to certain services and fines, and has no other authority for his possession than the copy of the court-roll made by the steward of the lord's court. A copy-hold is taken either in fee-

simple, fee-tail, for life, years, or at will; but generally in fee or for three lives.

CORAL, or *corallina*, a marine production, concerning which it is by no means agreed whether it be animal or vegetable. The species are several, distinguished by the form of their branches; and they are found adhering to shells, rocks, &c. Mr. Macdonald, in a paper on the coral of Sumatra, in the fourth volume of the *Asiatic Researches*, after referring that species of plant, as he denominates it, to the class of *Cryptogamia* of Linnæus, observes, that it differs from the descriptions of coral hitherto given, and, therefore, obliges us with the following account of it: "It is of three colours; red, black, and whitish-yellow; the last is the most common in the eastern seas. It is of a fungous texture, equally hard in and out of its natural element; and its pores are charged with a juice of a milky appearance, in some degree acrid. The bark covers every part of the tree, and contains a number of perforated papillæ, or pores, terminating in tubes. The internal projections of the papillæ adhere to the particles of sand and stone, on which the coral grows, and are the only appearance of roots it exhibits." The tree, in general, he observes, grows to the height of two feet, but in some instances to that of ten. From its rapid growth on the western coast of Sumatra, he thinks that the coral ought undoubtedly to rank as a vegetable: yet modern naturalists seem to have determined differently concerning this production of the ocean; some affirming it to be a fossil, formed like crystals and spars, while others rank it among the animal tribes. Sir

William Jones, in an additional note, defines corals and

CORALLINES, according to the approved system of Ellis, as the cretaceous habitations of animals, and one of the links in the great chain of nature. Mr. Macdonald's notion, that an artificial island, for the purpose of safe anchorage, might in time be produced from a quantity of corals, mixed with stones and other substances, transported to the coast of Coromandel, and sunk at the mouth of the dangerous part of Madras, is a very ingenious one, were it practicable; but sir William remarks, that it would, in all probability, occasion, from its quick increase, a dangerous reef of rocks, before that island could be formed.

CORDAGE, a term used for all sorts of cord of every size. Cords were originally made of leather, or the hides of animals: these gave way in this country to the use of iron chains. In more distant nations to the south; thongs and chains were superseded by the use of vegetable shreads, and the arts of combining them into strength. The junci or rushes, in later times were worked up into cordage, by our own ancestors, and hence, perhaps, old cables, and ropes, are now called "old junk."

CORDWAINER, the term whereby the statutes denominate a shoemaker. The word is from the French *cordouannier*, which Menage derives from *cordouan*, a kind of leather brought from Cordova, Cordona, or Cordua, a city of Andalusia. The shoemakers of London are incorporated under the name of the "company of cordwainers."

CORRIDOR, in architecture, a gallery leading to

several chambers, sometimes wholly inclosed, and sometimes open on one side.

CORINTHIAN order. See **ARCHITECTURE**.

CORINTHIANS, epistles to the, in the New Testament, are two letters addressed by the apostle Paul to the inhabitants of Corinth. The first was probably written from Ephesus about the year 56, in answer to some queries proposed by the Corinthians, and to correct some abuses and disorders which had crept in among them during his absence. The second was written about a year or two later, and upon similar topics.

CORK, the bark of the cork-tree, a species of *quercus*, or oak, growing, in great abundance, in Spain, Italy, and France. The bark is taken from the tree by making an incision down the whole height of the trunk, and, at each extremity, another round the girth. The tree is supplied with this coat in a degree so peculiarly abundant, that not only it continues to flourish uninjured by the act of barking, but, in its natural state, regularly sheds the whole, and acquires a new covering. The pieces of bark are flattened artificially, by placing them in water, and under heavy stones. The Spaniards employ them to line stone-walls, where they contribute to warmth, and absorb moisture. Imported into England, this substance furnishes employment to the

CORK-cutter, by whom it is half-burnt, and then, with a sharp knife, cut into pieces adapted, by their soft yet firm texture, for closing liquor-vessels. The workers at this business, which is sedentary, and simple in its operation, are frequently women,

who earn 7, 8, or 10s. a week: Cork is also applied to a few other purposes : among which the most remarkable is that of

Cork-jackets; from the buoyant nature of which, it is asserted, its wearer cannot possibly sink while it adheres to him. Provided with this valuable apparatus, neither strength, nor skill, nor courage, are said to be necessary; and a young lady may safely venture into even a rough sea.

CORN, farinaceous seed, as that of wheat, rye, barley, millet, rice, oats, maize, lentils, peas, or other plants. Anciently, men ate acorns, and the nuts, or mast, of the beech. The first cultivation of fields of corn was certainly a signal event in human history; but its date is wholly lost. Agriculture gives a new character to the species; and strikingly distinguishes its professors, not only from the animal race in general, but from those men who still, like that, subsist on the spontaneous productions of nature. Ceres, whose memory the poets have enveloped in fable, appears, if not to have invented the practice, at least to have introduced it into Greece, and other nations of that age and region. See **BREAD** and **FOOD**.

CORNS, in surgery, hard excrescences on the feet, occasioned by the pressure of shoes. Mr. Anthony Carlisle, surgeon to the Westminster-hospital, in the seventh volume of *Medical Facts*, gives an ingenious account of the formation and texture of the cuticle, and thence proceeds to show the cause of corns. The cuticle, which is formed, he thinks, of coagulate lymph, is composed of laminae of different degrees of thickness. When injured by pressure, the most usual cause of corns, it is

thrust off by new layers of cuticle, formed underneath it ; if the new layer be formed before the old one loses its hold, the two will be interwoven together ; and if the pressure which occasioned the injury be continued, new layers will go on to be formed, and at length the true-skin will be removed by absorption, thus allowing the diseased mass of cuticle to sink below the level of the living parts ; hence a cone of cuticle is formed, with its apex protruded among sensible substances. Corns may be dissolved, by first soaking in warm water, and afterwards applying the liquid caustic alkali. The management of this process, he says, requires some address, and often considerable patience and perseverance. A more tedious method is by the application of adhesive plaster, spread on leather, having a hole in the centre ; by this means, a pressure is made on the parts round the corn, by which the root will in time be protruded. This process is perfectly safe, but often requires five or six weeks for its accomplishment. A third method is by blister : the corn is to be cut close, and then a strong blistering-plaster is to be applied, extending a little beyond its circumference. This is particularly used for soft corns.

CORNELIAN. See CARNELIAN.

CORNET, in military economy, the third officer of a large company of cavalry, who bears the colours, and commands in the absence of a lieutenant.

CORNUCOPIA, the *horn of plenty*, or *Amalthea's horn*, a source whence, according to the ancient poets, every production of the earth was lavished ; a gift from Jupiter to his nurse, the goat Amalthea. In elucidation of this fable, it has been said

that in Lybia, the ancient name of a part of Africa, there was a little territory, in shape not ill-resembling a bullock's horn, which Ammon, the king, gave to his daughter, Amathea, the nurse of Jupiter.

COROL or **corolla**, see **BOTANY**.

COROLLARY, is an useful consequence drawn from something already advanced or demonstrated: thus it being demonstrated that a triangle which has two equal sides, has also two angles equal; this corollary will follow, that a triangle which has its three sides equal, has also its three angles equal.

CORONER, an officer in the British polity, whose duties are somewhat of the nature of those of a sheriff. Each county, however, has several coroners, in some instances to the number of six. A coroner is to inquire, with the assistance of a jury, into the cause of the death of any person dying by unnatural means, or in prison. If, by this inquest of murder, suspicion is found to attach to any one, he is to commit the suspected party for farther trial. He takes cognizance of goods brought on shore by shipwreck; and of all treasure-trove or property found and unclaimed. A coroner is also a substitute for the sheriff; and is to act whenever that officer is supposed to be interested in a process.

CORONET, an inferior crown worn by the nobility. See **HERALDRY**.

CORPORAL, in military economy, an inferior officer, under a serjeant, in a company of foot, who has charge over one of the divisions, places and relieves centinels, and keeps good order. His pay is about one third more than that of a private, above whom he is the first gradation.

CORPORATION, 'a body politic or incorporate, so called, because the persons or members are joined in one body, and thus qualified to take, grant, and do any other act necessary to the common concern. By means of corporations, powers and properties are erected and perpetuated independently of the individuals incorporated. The utility of these institutions may be illustrated by the case of a church-living. At the original endowment of parish churches, the freehold of the church, the church-yard, the parsonage-house, the glebe, and the tythes of the parish were vested in the then-parson by the bounty of the donor, as a temporal recompence for his spiritual care of the inhabitants, and with the intention that the same emoluments should ever after continue as a return for the same exertions. How, then, was this to be effected? The freehold was vested in the parson; and if we suppose it vested in his natural capacity, on his death it might descend to his heir, and would be liable to his debts and incumbrances; or, at best, the heir might be compellable, at some trouble and expense, to convey these rights to the succeeding incumbent. The law therefore has wisely ordained that the parson, *as parson*, shall, like the king, *as king*, never die; and this is done, by rendering the successive possessors of the living a body corporate. By this means, all the rights of the parsonage are preserved entire to the successor; the present incumbent, and his predecessor who lived seven centuries ago being, in law, one and the same person, so that what was given to the one, was given to the other also.—Corporations exist in such great numbers, and for so various purposes

(as municipal government, charity, church-property, learning, trade, &c.), that they cannot here be enumerated. They are described as either *aggregate* or *sole*; that is, including many members or one: the former are generally known; and the latter is that of which a church-living presents an example.

CORRECTION. See PRINTERS' marks.

CORRUPTION of *blood*, in law, an infection accruing to a man's state, attainted of felony and treason, and to his issue, for as he loses all to the prince, his issue cannot be heirs to him, or to any other ancestor by him, and if he be *noble*, his heirs will lose their right to the title.

CORSAIR, a cruiser, a name commonly given to the piratical cruising-vessels of Barbary, which, since the beginning of the sixteenth century, have infested the Mediterranean.

CORTES, a Spanish term signifying the states or assembly of the states: they were formerly held at Madrid; but since the invasion of Bonaparte, and the usurpation of his brother, the Cortes have been moveable, and have fled from place to place out of the reach of the tyrant.

CORYMBA, the umbrella tree, grows as tall as a ship's mast, and has the largest leaves of any vegetable, being of a size to cover twenty-men. These are used as paper, they serve also for covering houses in the room of slates. Most of the books which are shown in Europe for the Egyptian Papyrus are made from the leaves of this tree, which is called likewise the fan-palm on account of the leaves folding, when dry, like a fan.

COSMOGONY, in physics, the scientific theory of the formation of the world.

COSMOGRAPHY, the description of the world.

COTTON. See **Gossypium**.

COTYLEDON. A seed consists of three parts: viz. the cotyledons, the radicle, and the plumula, which are usually inclosed in a cover. If we take a garden bean, we may perceive each of these three parts with great ease; for this seed is of so large a size, that all its organs are exceedingly distinct; when we strip off the external coats of the bean, which are two, and of different degrees of thickness in different parts, we find that it easily divides into two lobes, pretty nearly of the same size and figure. Each of these lobes is called a cotyledon.

COVENANT, in law, the agreement or consent of two or more by deed in writing, sealed and delivered; whereby either, or one of the parties, promises to the other that something is already done, or shall be hereafter done: he that makes the covenant, is called the covenantor, and he to whom it is made is denominated the covenantee.

COUCHANT, in heraldry, is understood of a lion, or other beast, when lying down, but with his head raised, which distinguishes the posture of couchant from dormant, whereon he is supposed quite stretched out and asleep.

COUNCIL, in national affairs, an assembly of persons for the purpose of concerting measures of state. See **Kins**.

COUNCIL Aulic. See **Aulic**.

COUNCIL-Common, in London, a court consisting of the lord-mayor, aldermen, and common-councilmen, or representatives of the body of citizens

electd by the several wards, 'by which all by-laws or regulations for that city are made.

COUNCIL of war, an assembly of the principal officers of a fleet or army, called by the admiral or general to concert measures for requisite operations.

COUNTY, in geography, originally signified the territory or jurisdiction of a count or earl; but the word is now used in the same sense with shire. In this view, a county is a circuit or portion of the realm, into fifty-two of which England and Wales are divided for the better government, and the more easy administration of justice. See *JURISDICTION*.

COUNTY-palatine. See *PALATINE*.

COUNTY-corporate, a title given to several cities or ancient boroughs (as Southampton and Bristol), on which certain kings of England have thought proper to bestow peculiar privileges; annexing territory, land, or jurisdiction, and making them counties within themselves, with their own sheriffs and other officers.

COURAGE is such a firmness of mind, inspired by a sense of what is just and honourable, as amidst all the dangers and evils to which human life is incident, enables a man steadily to pursue the dictates of conscience and prudence.

COURT-baron, a court held by the steward within every manor. This court is of two natures; the one a customary court, appertaining entirely to the business of the copyholders [see *COPYHOLDER*]; the other a court of common law, in which the barons, or freeholders of the manor, as the *parres* or peers of each other, sit in judgment, the steward being rather the registrar than the judge. This court is competent to try, by "*writ of right*," all contro-

CRASSIA, relating to the right of lands within the manor, and also personal actions of debt or trespass, where the debt or damages do not amount to forty shillings: but the writ of right may be removed into the county-court; and all other actions into superior courts.

CRAB, in astronomy, and natural history. See **CANCER**.

CRANE, a machine used in building, on wharfs and in warehouses, for raising and lowering huge stones, ponderous weights, packages, &c.

CRANIOLOGY, a system of physiognomy, invented by Dr. Gall of Vienna. The chief principles on which this is founded are. (1) That the brain is the material organ of the internal faculties. (2) That it contains different organs for different faculties. (3) That we may judge of these different organs and their faculties by the exterior form of the cranium: in other words the formation of the cranium depends on the portion and prominencies of the brain, producing corresponding impressions and indentations.

CRAPE, a light transparent stuff, in manner of gauze, made of raw silk, gummed and twisted on the mill, and much used in mourning. The invention came from Bologna; but the chief manufacture of this stuff is said to be at Lyons, in France, and at Norwich in England.

CRAYON, a general name for all coloured stones, or other minerals and substances, used in designing or painting in pastel; whether they have been beaten and reduced to a paste, or are used in their primitive consistence, after sawing or cutting them into long narrow slips. In this last manner are red

crayons made of blood-stone or red-chalk, and black ones of charcoal and black-lead. Crayons of all other colours are compositions of earths reduced to paste. In painting with crayons, the artist should be apprized of one essential difference which should be observed between the application of colours in crayons and that of colours in oil. Colours used in a dry state have a much greater warmth of complexion than those in a wet one. For this reason, in order to produce a rich picture, a much greater proportion of what painters call "cooling tints," must be applied in crayon-painting than would be advisable in oil. To the absence of this consideration, it may be fairly attributed that many oil-painters have attempted crayons with but little success; and that crayon-painters, used to tints that, when wet, are of a cold nature, are apt to introduce them too abundantly when they paint in oil.

CAEST. See **HERALEDRY.**

CAVEUX, a term in sculpture, used by the French in a sense for which there is no corresponding term in the English language. Originally it signified a *hollow*, or *cavity*; and in sculpture it is applied where the lines and figures are cut below the surface of the substances engraved, and thus stands opposed to *relieves*, which latter term intimates the prominence of the lines and figures above the surface.

CRICKET, an active or manly game, played with bats and a ball, and which is almost peculiar to this country. The number of the party on each side is 11, who alternately take the innings, and alternately the throwing and watching. The essence of the game consists on the one side in an endeavour to knock down the wickets by bowling the ball from one wicket

to the other; or in endeavours to catch the ball when struck by those who manage the bats in defending the wickets against its attack; on the other, by striking the ball in such a manner as not to endanger its being caught, and to such a distance as to allow the batters to run and exchange wickets before the ball is returned to either of the bowlers, so that either of the wickets may be knocked down while one of the batters is absent from it, at more than the distance of the length of his bat. Every run from wicket to wicket constitutes a notch, and the game is decided by the number of notches obtained by one party over the other upon two innings of both.

Crim Tartary, or Crimea, the ancient Taurica Chersonesus, is a peninsula lying in the Black sea, by which it is bounded on the west and south; on the east by Circassia, and on the north by the Palus Mæotis, or sea of Asoph. It is situated between 44 and 46 degrees of north latitude, and between 40 and 44 degrees of east longitude. The chief of the Crim Tartars is dependent in a good measure on the Turks, whom he is obliged to furnish with 30,000 men when required. The chief trade of the Tartars is in slaves; and in exchange for these, they receive rice, coffee, raisins, dates and clothing.

CRIME, an offence. The subject of crimes and punishments, so intimately connected with the good order of society, is naturally an interesting one to all persons of reflection. It is notorious that many nations have laws indefensible upon any right view of this matter; and still more so, that the opinions and judgments of individuals are frequently in the last degree incorrect. To enter into the subject, the

limits of this work will not permit; all that can be allowed is the insertion of a few hints that may assist a methodical survey of this important topic. Under the heads **LAW**, and **PUNISHMENT**, are some observations connected with this inquiry. Here, it will be only attempted to exhibit the nature of crime in a perspicuous point of view. It is only the offences against society that shall be spoken of in this place: the rest are not within the province of the legislator; but are against our Creator, and belong to *religion*, or against ourselves or immediate connections, and belong to *morals*. These latter are to be corrected by the priest or the philosopher; the former are amenable to law, and should be considered and punished as proceeding from one of the following sources:

I. DISAFFECTION
to a governing
power,

II. INDOLENCE,
or inaccurate
ideas of, the
right of pro-
perty, or ab-
solute want,

III. FEROCITY, or
uncurbed pas-
sion,

IV. MALICE,

1. Sedition,
2. Treason.

1. Pilfering,
2. Pilfering, with breach of con-
fidence,
3. Highway robbery,
4. Burglary,
5. Fraud, &c.

1. Wantonly doing that which
may injure others,
2. Breach of the peace,
3. Maiming,
4. Manslaughter, murder, &c.

1. Injuries wholly malicious; that
is, where the culprit has pro-
posed no benefit to himself, or
any other;

2. Murder

Whence

It may also be added, in distinguishing between words often esteemed synonymous, that actions contrary to the precepts of religion are called "sins;" actions contrary to the principles of morals are called "vices;" and actions, contrary to the laws of the state, are called "crimes." A sin, a vice, a crime, are therefore evidently the objects of theology, ethics, and jurisprudence.

CARRIAGE DAYS, are those on which it has been supposed the termination of diseases, and especially of continued fevers, has happened, these are the third, fifth, seventh, ninth, eleventh, fourteenth, seventeenth, and twentieth.

CROCODILA, fossil, one of the greatest curiosities which later ages have produced. It is the skeleton of a large crocodile, almost entire, found at a great depth under ground, and bedded in stone. It was discovered in the side of a large mountain in the midland part of Germany. It had the back and ribs very plain, and was of a much deeper black than the rest of the stone, as is the case in the fossile fishes which are preserved in this manner. The part of the stone in which the head lay was not found, this being broken off just at the shoulder, but that irregularly, so that in one place a part of the head was visible in its natural form. The two shoulder bones were very fair, and three of the feet were well preserved; the legs were of their natural shape and size, and the feet preserved even to the extremities of the five toes on each of them.

CROISADE, or CRUSADE (from *croix*, French, *crux*, Latin), in the ancient history of Europe, a military expedition of the Christians against the infidels of Palestine, for the conquest of that country. The

croisades took place between the years 1096 and 1291; in which latter year the town of Acre was taken by the sultan or sultan of Egypt, and the Christians entirely driven out of Syria. These expeditions are generally spoken of by Protestants with indiscriminate abuse; but, considering what human history is, they do not, it may appear to impartial eyes, fill a page peculiarly marked with absurdity and blood-shed. War was the business of the barbarians by whom they were undertaken; and the religious ideas they had received were certainly such as to excite and justify the most enthusiastic actions. On the side of the assailants only, two millions of lives are, indeed, computed to have been sacrificed; thousands of children were led to perish, or to be sold for slaves by their schoolmasters, in the Holy-Land, deluded by the sophistical application of the words, "out of the mouths of babes and sucklings hast thou perfected praise;" with these and a thousand other disasters they may doubtless be reproached: that their crimes were such as to impress the Mahometan nations with lasting hatred of the Christian name may also be allowed; that their internal-quarrels rendered them despicable foes, and their ferocious manners, infamous conquerors, cannot be denied: but their cruelty was the cruelty of zealots, the dictation of ignorance. When by the result of temporary success, Jerusalem fell into their hands, the garrison was put to the sword, and the inhabitants, men, women, sucking children, massacred without distinction; and defenceless females butchered in the caves to which they had fled for refuge: yet these were not the actions of Atheists,

of men who set Heaven at defiance, or of interests, without regard, without affection, for their fellow creatures, or even high notions of moral rectitude; these were the gallant knights of whom christian-dom has boasted, and of whom she continues to boast; these were they whom so many maidens loved, and by whom so many maidens were protected; and who, even in the very moment of their fury, marched over its dying victims toward the holy sepulchre, and there, while the blood was yet warm on their hands, sung anthems to the Son of God, and burst into tears of gratitude for their victory. Of the turpitude of the croisaders, something is to be attributed to the age, and something to zeal, which never yet was in arms without being ferocious; and posterity may forgive the men by whom, through the energies which they called into action and the learning and refinement which they were the means of bringing from the countries they ravaged, it has been taught to perceive and renounce the errors of which they were guilty.

CROSSLICH, a term known in British Antiquities to denote large, broad, flat stones raised upon other stones set up to support them. They are common in Anglesea, and are by some supposed to be remains of sepulchres, by others to be altars. They may indeed have been both, being originally reared as tombs, and afterwards used as altars.

Cross, instead of a signature in writing, is derived from the Saxon custom of affixing the sign of the cross, whether the affixer could write or otherwise.

Cross-bow, also called the *arbalist*, receives the former name from its figure; the machine con-

sitting of a steel bow, fixed at the end of a short shaft or stock, furnished with a string or trigger. It serves to expel bullets, stones, arrows, and darts.

CROTALUS, the rattle-snake, a genus of serpents furnished with poisonous fangs. The serpents of this family seldom bite except when irritated, or for the purpose of securing their prey. Their possession of the fascinating power which has been attributed to them is uncertain; the fact, that small birds, squirrels and leverets, descend spontaneously, from the branches of the tree under which the rattle snake lies, and are devoured by it, seems to be generally admitted, though it is very difficult to be accounted for. The more common opinion is that the animals thus devoured are in the first place terrified by the noise of the snake's rattle, and hence lose all power of self-government, or continue to fly from branch to branch till they are so exhausted as to be compelled to fall down within its reach. The rattle consists of hollow, hard, dry, and semi-transparent bones resembling in some measure, the shape of the human *os sacrum*: the tip of every uppermost bone runs within two of the bones below it; by which contrivance they have not only a moveable coherence, but also are enabled to make a more multiplied sound, each bone hitting against the other two at the same time. The number of joints in the rattle of individuals is various, from five to forty. The poisonous secretion is discharged from the fangs of the dog teeth, or tusks placed without the upper jaws, after the manner of the viper, and after the first time the animal seems progressively to lose its power of poisoning, till it has had time to recruit itself by a respite of some hours: so that the

second bite, if given immediately after the first, does not prove so injurious, the third still less so, and the fourth does, perhaps, scarcely any mischief at all.

CROTON, or wild ricinus, is a botanical genus containing 51 species, of which may be noticed, the *croton tinctorium*, or turnsole, which is used as a colouring matter in various arts and chemical processes: the substance thus used is found between the empalement and the seeds: *croton sebiferum*, or tallow tree, is a native of China, about the size of a cherry tree. The fruit is enclosed in a pod, and consists of three round white grains of the size of an ordinary hazel nut, with a small stone in the interior. From the kernels or expressed oil, the Chinese obtain tallow, of which they make their candles.

CROTOPHAGA, a genus of birds, natives of South America, noticed on account of a curious peculiarity belonging to the females, several of which lay their eggs in the same nest, which is the united work of them all. Each contributes, likewise, her share to the general process of incubation, and to provide food for the common family. These birds are said to pick out the acari from the backs of cattle infested with them, for which purpose, they lie down spontaneously.

CROWN, an ornament worn on the head by kings, sovereign princes, and nobles, as a mark of dignity. In heraldry, it is used for the representation of that ornament in the mantling of an armory to express the dignity of persons. The Romans had various kinds of crowns, as 1. The oval crown, made of myrtle, and bestowed on victorious generals. 2.

The naval crown, composed of a circle of gold, with ornaments representing the beaks of ships, and given to the officers or men who first boarded an enemy's ship. 3. The crown given as a reward to him who first forced the enemy's entrenchments. 4. The mural crown, given to him who first mounted the wall of a besieged place, and there lodged a standard. 5. The civic crown, made of the branch of a green oak, and given him who had saved the life of a citizen. These and other crowns were given as marks of honour, and upon competitions with rivals for rank and dignity often determined the preference in their favour.

CROWN-Office. The court of king's bench is divided into the plea-side and the crown side. In the plea-side it takes cognizance of civil causes, in the crown side it takes cognizance of criminal causes, and is therefore called the crown office. In the crown office are exhibited informations in the name of the king, of which there are two kinds, 1. Those filed *ex officio* by the king's attorney general. These are properly the king's own suits. 2. Those in which, though the king is the nominal prosecutor, yet, it is done at the instance of some private person or common informer; these are usually filed by the master of the crown office.

CRUCIBLE, a vessel made of earth, and so tempered and baked as to indure the greatest fire. It is used in chemical operations, and by workers in gold and silver. See **CHEMICAL APPARATUS.**

CRUISER, from the German *kruiss*, "across," a small armed vessel that sails to and fro in quest of the enemy, and to secure those of its own nation.

CRUSADE. See **CRUSADE.**

CRUOR, sometimes signifies the blood in general ; sometimes only the venous blood, and at others extravasated or coagulated blood ; but the word is most frequently used for the red globules of blood, in contradistinction to the limpid or serous part.

CRUSTACEOUS fish, are those covered with shells consisting of several pieces or scales, as those of crabs, lobsters, &c. These are generally softer than the shells of the testaceous fish, which consist of a single piece, and commonly thicker and stronger than the former, such as those of the oyster, scallop, cockle, &c. The crustacea consist almost entirely of the three tribes, viz. cancer, oniscus, and maneculus.

CRYPTOGAMIA, the 24th class of vegetables in the Linnæan system; comprehending those whose fructification is concealed or inconspicuous, as ferns, mosses, liverworts, and mushrooms. See **BOTANY**.

CRYSTAL, a species of stones of the quartz kind, belonging to the siliceous class. When no accidental circumstance has interrupted the crystallisation (for it must once have been in a soft state), it is always of an hexagonal (six-sided) angular form, pointed at both ends. Crystal is found of various colours. It is frequently cut; and lustres, vases, and toys, are made of this, as of other beautiful stones. In the imperial collection at Vienna, there is a pyramidal, crystal vase, two ells in height, wholly cut out of one crystal.—The formation of crystals is one of the most ordinary operations of nature. This is evident from the sparry stalagmites (resemblances of icicles), in the arches of modern buildings: particularly Westminster bridge, the

roofs of the arches of which were filled with these spars within a year after they were built.

CUBE, a regular solid body, consisting of six square and equal sides, and the angles all right, and therefore equal.

CUBE-root of any number or quantity, is such a number or quantity as, if multiplied by itself--and then the product thence arising by that number or quantity, being the cube-root--this last product shall be equal to the number or quantity whereof it is the cube root: thus, 2 is the cube-root of 8; because two times two is 4, two times 4 is 8.

Cuckoo, a genus of birds belonging to the order of pies or *picæ*. The habit, peculiar to this bird, of laying its egg in the nest of others of different species, is well known; but that the young one is no sooner hatched than all the eggs or young of its foster parents are pushed out to perish together, either entangled about the bush which contains the nest, or scattered on the ground under it, is not, perhaps, of equal notoriety. The following little narrative is extracted from a paper in the *Philosophical Transactions*, by the honourable Daines Barrington: "A hedge-sparrow built her nest in a hawthorn bush in a timber-yard. After she had laid two eggs, a cuckoo dropped in a third. The sparrow continued laying as if nothing had happened, till she had laid five, her usual number, and then sat. On inspecting the nest, June 20, 1786, I found that the bird had hatched that morning, and every thing but the young cuckoo was thrown out. Under the nest, I found one of the young hedge-sparrows dead, and one egg by the side of the nest entangled with the coarse woolly

materials that formed its outside covering. On examining the egg I found one end of the shell a little cracked, and could see that the sparrow it contained was yet alive. It was then restored to the nest, but in a few minutes was thrown out. The egg being suspended by the outside of the nest, was saved a second time from breaking. To see what would happen if the cuckow was removed, I took out the cuckow, and placed the egg containing the hedge-sparrow in its stead. The old birds, during this time, flew about the spot, showing signs of great anxiety ; but when I withdrew, they quickly came to the nest again. On looking into it a quarter of an hour afterward, I found the young one completely hatched, warm and lively. The hedge-sparrows were suffered to remain undisturbed with their new charge for three hours, during which time they paid every attention to it, when the cuckow was again put into the nest. The old sparrows had been so much disturbed by these intrusions, that, for some time, they showed an unwillingness to come to it : however, at length, they came ; and, on examining the nest again in a few minutes, I found the young sparrow was tumbled out. It was a second time restored ; but again experienced the same fate.—From these experiments, and supposing from the feeble appearance of the cuckow, just disengaged from the shell, that it was utterly incapable of displacing either the egg or the young sparrow, I was induced to believe that the old sparrows were the only agents in this seemingly unnatural business : but I afterwards clearly perceived the cause of this strange phenomenon, by discovering the young cuckow in the

act of displacing his fellow-nestlings." Mr. Jenner remarks, that though nature permits the young cuckow to make this great waste, yet the animals thus destroyed are not thrown away or rendered useless. At the season when this happens, great numbers of tender quadrupeds and reptiles are seeking provision; and if they find the callow nestlings which have fallen victims to the young cuckow, they are furnished with food well adapted to their peculiar state. The bird arrives in Britain about the middle of April, commonly on the 17th, and departs in the first week of July. To this shortness of the period of residence, joined with the numerous progeny which nature has destined it to yield, Mr. Jenner attributes the motive for this singular arrangement in the economy of nature. By means of this resource, cuckow's eggs are laid in an abundance that could not be effected if the bird was to sit herself; and, beside, the egg laid on the last day before she quits the country is left in careful hands, and the young one follows at a future period.

Another species of the *Cuculus* or Cuckow genus is the Cuckow Indicator or "Honey-guide," which is an inhabitant of Africa, and has an extraordinary faculty of discovering honey, of which it is very fond. The Dutch farmers and Hottentots near the Cape of Good Hope imitate the sound of this bird in the morning before it goes to feed, which brings it to them, and when it moves off for its repast, they follow, as correctly as possible, the direction of its flight, and scarcely ever fail to arrive at some store of wild honey.

CUCUMBER, See the next article.

CUCURBITACEÆ, the name of an order in the fragments of **Linnaeus**, consisting of plants which resemble the gourd in external figure, habit, virtues, and sensible qualities. These are divided into two sections. 1. Those with hermaphrodite flowers, as the passion-flower. 2. Those with male and female flowers produced either on the same or distinct roots, as the cucumber, &c. In these the male flowers are generally separate from the female on the same root, and that either in the same angle of the leaves, as in the "sicyos" or serpent cucumber; or in different angles, as in the gourd.

CULEX, the gnat: is produced from an aquatic larva, of very singular appearance, which, when first hatched from the egg, measures about the tenth part of an inch. The eggs of the gnat are deposited in groupes of three or four hundred together, are extremely small, and are placed on the surface of the water close to the leaf or stalk of some water plant. It feeds on the minute vegetable and animal particles which it finds on the stagnant water, the head being armed with hooks to seize on aquatic insects, and other kinds of food. When arrived at its full growth, it casts its skin and commences chrysalis. In this state, like the larva from which it proceeded, it is loco-motive, springing about in the water in a similar manner. When ready to give birth to the included gnat, which usually happens in three or four days, it rises to the surface, and the animal quickly emerges from its confinement. Gnats are very troublesome in all countries, but particularly in Lapland, where the air is literally filled with such swarming myriads, that the inhabitants can scarcely venture out of the

smoke of their fires : here however the larva which fill the lakes of Lapland form a delicious and tempting repast to innumerable multitudes of aquatic birds, and thus contribute to the support of the very people which they so dreadfully torment.

CULMINATION, is the passage of any heavenly body over the meridian, or its greatest altitude for any given day.

CULPRIT, a formal reply of a proper officer in court, in behalf of the king, after a criminal has pleaded not guilty, affirming him to be guilty. The term is taken from *culpabilis* and *pret*, importing that he is ready to prove the accused guilty.

CULVERINE, a long slender piece of ordnance, serving to carry a ball to a great distance.

CUP-galls, a name given to a curious kind of galls found on the leaves of the oak, and some other trees. They contain the worm of a small fly that passed through all its changes in this habitation, being sometimes found in shape of a worm, sometimes in the nymph and sometimes in the fly-state, in the cavity.

CUPRESSUS, a genus in botany, of which the most beautiful species is the horizontal cyprus, which is the common timber in some parts of the Levant, and is said to resist the worm, the moth, and putrefaction. The doors of St. Peter's at Rome, which lasted eleven hundred years, to the time of Pope Eugenius, were perfectly sound and entire when they were exchanged by that Pontiff for gates of brass. The Athenians used to bury their dead in coffins of cypress, and the mummy chests brought with those bodies out of Egypt are made of their wood.

CURATE, an officiating, but unbeneficed, clergyman, who performs the duty of a church, receives a salary from the incumbent of the living, and may be displaced by him or by the bishop. Other curates are perpetual. These are appointed where the tithes are impropriated, or in the hands of laymen, and no vicarage is endowed. This situation is for life, or during good behaviour; and the profits arise either from a fixed stipend or from a certain portion of the tithes.

CURCULIO, a genus of insects of the Coleoptera order, of which the *curculio nucum*, or nut-weevil, is the insect produced by the maggot residing in the hazel nut, and is universally known. The female pierces the young nut with its proboscis, and deposits an egg, which is hatched there, and the worm lives on the kernel, till at length the nut falls to the ground, and the insect creeps out of the hole which it has made by gnawing. It burrows underground, where it lies dormant 7 or 8 months, and then casting its skin commences a chrysalis of the beetle tribe, in due course it casts its skin again and appears an inhabitant of the upper world. Many of the species of foreign and hot climates are large and of extreme beauty, but the most brilliant is the "*Imperialis*," or diamond beetle, a native of Brazil, which, when seen through a magnifying-glass, affords one of the finest sights imaginable.

CURFEW, a signal given in cities taken in war, &c. to the inhabitants to go to bed. Pasquin says, it was so called, as being intended to warn people to secure themselves against the robberies and riots of the night. The most eminent curfew in England was that established by William the Conqueror,

who ordained that, at the ringing of a bell at eight o'clock in the evening, every one, under severe penalties, should extinguish lights and fires, and go to bed : whence, to this day, a bell rung about this time is called a curfew-bell.

CURRENT, a term used to express the present time : thus, 1811 is the current year : the eighth current is the 8th of the present month. The price current is the known and ordinary price. We say "current coin" for the known and common coin of the country.

CURRYING, the business of a *currier*, or the method of preparing leather with oil, tallow, &c. The chief occupation is in softening and suppling ox and calf skins, which make the upper leathers of shoes, coverings of saddles, coaches, and manufactures that are required to keep out water. The currier receives the skins from the tanner.

CUSTOMS, in political economy, the duties, toll, tribute, or tariff, payable to the king upon merchandize exported and imported, and which form a branch of the perpetual taxes. They were denominated, in the barbarous Latin of the ancient English records, "*custuma*," an appellation which seems to be derived from the French word "*coutum*" or "*coutum*," which signifies toll or tribute, not "*consuetudines*," which is the language of the law, whenever it means customs, usages. Customs, as increasing the prices of commodities in an immoderate degree, creating the offence of smuggling, and requiring great expenditure in their collection, are among the most impolitic and unstatesman-like means of raising a public revenue.

The ancient customs of England have been

usually divided into three branches. 1. The duties on wool and leather : 2. The duty on wine at so much per ten, called tonnage : and 3. The duty upon all other goods at so much in the pound denominated poundage. At this time there are more than 1200 articles subject to the custom duties, and in the year 1806 they produced a net sum of very nearly twelve millions sterling.

CUSTOM-house, an office in a maritime city or port-town, for the receipt of customs.

CUSTOS rotulorum, an officer who has the custody of the rolls and records of the sessions of peace, and also of the commission of the peace itself. There is one in each county.

CUTICLE, a thin membrane closely lying upon the skin or cutis, of which it seems a part, and to which it adheres very firmly.

CUTIS is that strong covering which envelopes the whole external surface of animals. The cutis is a peculiar modification of gelatine enabled to resist the action of water; and readily converted into glue.

CUTLERY. Though cutlery in the general sense comprises all those articles denominated edge tools, it is more particularly confined to the manufacture of knives, forks, scissors, pen-knives, razors, and swords. Damascus was anciently famed for its razors, sabres, and swords. The latter are said to possess all the advantages of flexibility, elasticity, and hardness. All those articles of cutlery which do not require a fine polish, and are of low price, are made from blistered steel. Those articles which require the edge to possess great tenacity, at the same time that superior hardness is not required, are

made from sheer-steel: The finer kinds of cutlery are made from steel which has been in a state of fusion, and which is termed cast-steel, no other kinds being susceptible of a fine polish. Table knives are mostly made of sheer-steel, the tang and shoulder, or bolster, being of iron, the blade part being attached by giving them a welding heat: The knives after forging are hardened by heating them red hot, and plunging them into water; they are afterwards heated over the fire till they become blue, and then ground. The handles of table-knives are made of ivory, horn, bone, stag-horn, and wood, into which the blades are cemented with resin and pulverized brick. Forks are made almost altogether, by the aid of the stamp and appropriate dies: The prongs only are hardened and tempered. Razors are made of cast-steel, the edge of a razor requiring the combined advantages of great hardness and tenacity. After the razor blade is forged, it is hardened by gradually heating it to a bright red heat, and plunging it into cold water. It is tempered by heating it afterwards till a brightened part appears of a straw colour. It would be more equally effected by sand; or what is still better, in hot oil, or fusible mixture consisting of eight parts of bismuth, five of lead, and three of tin. A thermometer being placed in the liquid at the time the razors are immersed for the purpose of indicating the proper temperature, which is about 500° of Fahrenheit. After the razor has been ground into its proper shape, it is finished by glazing and polishing. The glazer is formed of wood, filled with an alloy of lead and tin; after its face is turned to the proper form and size, it is

filled with novulles, which are filled up with emery and tallow. This instrument gives to the razor a smooth and uniform surface, and consequently a fine edge. The polisher consists of a piece of circular wood running upon an axis, like that of the stone or the glazior. It is coated with leather, having from time to time its surface covered with crocus martia. The handles of high priced razors are made of ivory and tortoise shell, but in general they are of polished horn, which are preferred on account of their cheapness and durability. The horn is cut into pieces, and placed between two corresponding dies, having a recess of the shape of the handle. By this process the horn admits of considerable extension; if the horn is not previously black, the handles are dyed black by means of a bath of logwood and green vitriol. The clear horn handles are sometimes stained so as to imitate the tortoise-shell: this is effected by laying upon the handle a composition of three parts of potash, one of minium, ten of quicklime, and as much water as will make the whole into a pulpy mass. Those parts of the handle requiring darker shades, are covered thicker than the other. After this substance is laid upon the handles, they are placed before the fire the time requisite for giving the proper effect.

The manufacture of pen-knives is divided into three departments; the first is the forging of the blades, the spring, and the iron scales; the second, the grinding and polishing of the blades; and the third, the handling, which consists in fitting up all the parts, and finishing the knife. The blades are made of the best cast steel, and hardened and tem-

pared to about the same degree with that of scissors. In grinding they are made a little more concave on one side than the other; in other respects they are treated in a similar way to razors. The handles are covered with horn, ivory, and sometimes wood; but the most durable are those of stag-horn. Their most general fault in pen-knives is that of being too soft. The temper ought to be not higher than a straw colour, as it seldom happens that a pen-knife is so hard as to snap on the edge.

The beauty and elegance of polished steel is not displayed to more advantage than in the manufacture of the finer kinds of scissors. The steel employed for the more valuable scissors should be cast steel of the choicest quality; it must possess hardness and uniformity of texture for the sake of assuming a fine polish, great tenacity when hot for the purpose of forming the bow or ring of the scissar, which requires to be extended from a solid piece, having a hole previously punched through it. It ought also to be very tenacious when cold, to allow that delicacy of form observed in these scissors termed ladies' scissors. After the scissors are forged as near to the same size as the eye of the workmen can ascertain, they are paired. The bows and some other parts are filed to their intended form, the blades are also roughly ground, and the two sides properly adjusted to each other after being bound together with wire and hardened up to the bows. They are afterwards heated till they become of a purple colour, which indicates their proper temper. Almost all the remaining part of the work is performed at the grinding mill, with the stone, the lap, the polisher, and the brush.

It is used to polish those parts which have been filed, and which the lap and the polisher cannot touch. Previously to screwing the scissars together for the last time, they are rubbed over with the powder of quick-lime, and afterwards wiped clean with a skin of soft sheep leather! The quick-lime absorbs the moisture from the surface, to which the rusting of steel is justly attributed. Scissars are frequently beautifully ornamented by blacing and gilding, and also with studs of gold or polished steel. The very large scissars are partly of iron and partly of steel, the shanks and bows being of the former. These, as well as those all of steel which are not hardened all over, cannot be polished: an inferior sort of lustre, however, is given to them by means of a burnisher of hardened polished steel, which is very easily distinguished from the real polish by the irregularity of the surface. See REES'S NEW CYCLOPEDIA:

CUTTER, a small vessel calculated for swift sailing, furnished with one mast, and rigged as a sloop. They are commonly navigated in the English Channel; and are usually either engaged in contraband trade, or employed by government to take those that are so.

Cutting, or engraving on wood, an art carried to a great pitch two hundred and fifty years ago, and now revived and practised in great perfection. In many subjects, the engraving on wood has a richness which cannot be procured on copper. Of modern books that have been decorated with specimens of this art, the *British birds*, some of the designs in the *Fabliaux*, and Mr. Bulmer's edition of *Somerville's Chase* will, perhaps, afford examples no

where surpassed. Cutting on wood is also practised for many coarser purposes, as in printing on licoes and paper-hangings. The best wood for the blocks is that of box, as being of the finest grain, and the least liable to warp, or be worm-eaten. In this kind of engraving, no part, it must be obvious, can be etched. The other peculiarity is, that in this, that which is to print white is cut away, while, in copper engraving, the white is left untouched. Hence, it may often be observed, that in fine wood-engravings, beautiful lights present themselves, which, there, are among the smallest parts of the artist's merit, while, in copper, the same would be admirable, if not impracticable. Ugo da Carpi, an Italian painter of no very considerable talents, was the inventor of that species of engraving on wood distinguished by the name of *chiaro-oscuro*, in imitation of drawing. This is performed by using more blocks than one; and Carpi commonly had three: the first the outline and dark shadows; the second for the lighter shadows; and the third for the half-tint. In this manner he produced prints after several designs and cartoons of Raphael; particularly one of the Sybil, a descent from the cross; and the history of Simon, the sorcerer. He died in 1500. This art was brought to a great height by Baldassar Peruzzi, of Sienna, and by Perugiano, who published several excellent pieces.

CYCLE, in chronology, a certain period or series of numbers, which regularly proceed from the first to the last, and then return again to the first, and so circulate perpetually. See **CHRONOLOG.**

CYDER, a drink made of the juice of apples by

expression. The sweeter apples make the most agreeable cyder. In pursuing the Devonshire method in the requisite process, it is to be observed, 1.

That all the promiscuous kinds of apples that have dropped from the trees, from time to time, are to be gathered up and laid in a heap by themselves, and to be made into cyder after having lain so about ten days. 2. Such apples as are gathered from the trees having already acquired some degree of maturity, are likewise to be laid in a heap by themselves, for about a fortnight. 3. The later hard fruits, which are to be left on the trees till the approach of frost is apprehended, are to be laid in a separate heap, where they are to remain a month or six weeks, by which, notwithstanding frost, rain, &c. their juices will receive such maturation as will prepare them for a kindly fermentation, and which they could not attain on the trees by reason of the coldness of the season.

CYLINDER, in geometry, a solid body, supposed to be generated by the rotation of a parallelogram. If the generating parallelogram be rectangular, the cylinder it produces will be a right cylinder, that is, it will have its axis perpendicular to its base. If the parallelogram be a rhombus, or rhomboides, the cylinder will be oblique or scalenous.

CYLINDER, properties of the, 1. The section of every cylinder by a plain oblique to its base, is an ellipsis. 2. The superficies of a right cylinder is equal to the periphery of the base multiplied into the length of its side. 3. The solidity of a cylinder is equal to the area of its base, multiplied into its altitude. 4. Cylinders of the same base, and standing between the same parallels, are equal. 5. Every cylinder is to

a spheroid inscribed in it, as 8 to 9, 6. If the altitudes of two right cylinders be equal to the diameters of their bases, those cylinders are to one another as the cubes of the diameters of their bases.

CYNICS, a sect of ancient philosophers who valued themselves upon their contempt of riches and state, arts and sciences, and every thing, in short, except virtue and morality. This sect was founded by Antisthenes, and is not so much to be regarded as a school of philosophy, as an institution of manners. Its sole object was to subdue the passions, and produce simplicity of manners.

CYNIPS, the gall fly, a genus of insects of which there are 35 species, chiefly found in the oak. The most beautiful gall is the production of the cynips quercus gemmae, who piercing the terminal bud of the tree deposits its egg in the interior, and hereby, with the hatching and progressive growth of the larva converts it from a healthy bud into a fine dark green gall, leafed like a rose-bud beginning to blow, about an inch in diameter, and held to the branch by a pedicle.

CYPHER, denotes certain secret characters disguised and varied; used in writing letters that contain some secret, not to be understood or discovered but by those between whom the cypher is agreed on. Writing in cypher is chiefly practised in diplomatic correspondence, or in affairs that relate to war, &c. It should possess these three properties: the characters should be easily written and read: they should be very difficult of being found out, and they should be clear of suspicion. See Rees's New Cyclopaedia, in

which under the word Cipher, the whole art is exhibited. See *DIPLOMATIC letters*.

OTPAKA, or cowry, a shell which contains an animal of the slug kind. Cowries are found in the Persian Gulph and Indian Ocean, and some in the Mediterranean, and other seas. In many parts they are used as money in the way of commerce.

CYPRUS, the carp, a genus of fishes of which the most remarkable species is the gold-fish, known here as an object of curiosity, but a native of China, where it is kept in vases of immense size and exquisite workmanship. It appears sensible of favours, capable of attachment, and is one of the most interesting objects of attention and care to the ladies of that country.

CZAR, a word which, in the Slavonian language, signifies "king." This was the title by which the sovereigns of Muscovy were known, till, about the year 1772, Peter the Great obtained the consent of the European Powers to style himself and his successors, Emperors of all the Russias. Previously to this, the Czar was sometimes called "his Czarian majesty."

D.

D, the fourth letter in the Alphabet, is a kind of middle sound between the *s* and *th*, its sound is formed by a stronger impulse of the tongue to the upper part of the mouth, than is necessary in the pronunciation of the *s*. It is called a lingual letter because the tongue has the principal share in

the pronunciation of it. *D.* denotes as a numeral, 500, and with a dash over it *Ḑ* is 5000: as an abbreviation it stands for Doctor as *D. D.* doctor of Divinity, &c. *D. D. D.* are used in dedications for *deus, dicat dedicat*: and *D. D. D. D.* for *dignum Deo donum dedit*.

DACTYL, a foot in the Latin and Greek poetry, consisting of a long syllable followed by two short ones; as, *mūrmūrē*.

DEMON, a name used by the ancients for certain supernatural beings, whose existence they supposed. They were spirits or genii who appeared to men, either to do them service or to hurt them. The platonists distinguish between Gods, demons, and heroes. The *dæmons* are those since called *argels*. Christians, by the word *dæmon* understand only evil spirits or devils. Socrates and Tasso spoke, in very distant ages, of being each attended by a *dæmon* or familiar. In Tasso, this pretension has been referred to an hypochondriac state of mind; in Socrates, the matter has given rise to much speculation. From the manner, however, in which the philosopher is said to have described his *dæmon*, there seems good reason to believe that he spoke figuratively of his natural conscience or intellect: "it directed him how to act in every important occasion of life, and restrained him from imprudence of conduct."

DANOMAY, a country of Africa, on the slave coast, situated 60 or 70 miles from the Atlantic: the capital is Abomey. All kinds of fruits abound in this fertile country: the inhabitants have two crops a year: their language is Portuguese: their religion

a most miserable superstition, and their government the most perfect despotism upon earth.

DAIRO, a high dignity in Japan. This empire is said to be under two sovereigns, an ecclesiastical one called the *Dairo*, and a secular one who bears the title of *Kubo*.

DAIRY, a building appropriated to the management of milk, and the manufacture of butter and cheese. Situation and cleanliness are the two grand considerations on this subject: the first should be airy and cool; the second, the most perfect possible. It should be neatly paved, near running water, and its windows should never front the south, south-east, or south-west.

DAMASK, a silk-stuff, with a raised pattern, so as that the right-side of the damask is that which has the flowers raised or satined. It has its name from being originally brought from the city of Damascus in Syria.

DAMASK, a kind of wrought linen, made in Flanders, and obtaining its name from its large patterns in the manner of Damask.

DAMASK, is a name also given to a very fine steel brought from Damascus, and used for sword-blades and cutlasses. See **CUTLERY**.

DAMASKEENING, or *damasking*, the art or operation of beautifying iron, steel, &c. by making incisions on those metals, and filling them up with gold and silver wire. This method of ornament is chiefly used for sword blades, guards, and grips, locks of pistols, &c.

DAMPS, in natural history, noxious steams and exhalations issuing from the earth. These damps

are chiefly observed in mines and coal-pits : but vapours of the same description will often escape from old lavas of burning mountain ; and in those countries where volcanoes are most common, will enter houses, and kill people suddenly. Four kinds of damp are usually reckoned. Of the approach of the first, or “choke-damp,” which is the most ordinary, the workmen are warned by the circular shape assumed by the flame of their candle, which lessens gradually till it expires, and by their own difficulty of breathing. Those who escape swooning, seldom suffer any harm from it ; but such as swoon away, though not absolutely suffocated, yet experience on their recovery very violent convulsions. The second kind is the *pease-bloom* damp, so called from its smell. The miners in the peak of Derbyshire fancy it arises from the great number of the red trefoil flowers, which they call honey-suckles, that abound in the limestone meadows of the peak. This damp, they say, always comes in the summer-time, but has never been known to be mortal : probably its smell gives timely notice to avoid its effects. The third is the most pestifential, and the most extraordinary of any, if what is said of it be true. Mr. Jessop, who describes this and the former, had his accounts from the miners. Those who pretend to have seen it describe it thus : in the highest parts of the roof of those passages, in a mine which branches out from the main grove, they see, suspended, a round thing, about the bigness of a foot-ball, which, when covered with a film of the thickness and colour of a splinter, or any other accident, the damp immediately flies out and suffocates all the company. The miners

have a way of breaking it at a distance, by means of a stick and long rope ; and when they have done this, they purify the place with fire. They assert that it is formed from the steam of the candles and their own bodies, ascends to the highest part of the vault, and there condenses ; and that, in time, a film growing over it, it becomes pestilential. The fourth is the fulminating, or fire damp, which being touched with the flame of a candle, takes fire, and explodes with extreme violence.

DAMSEL, from the French *damoiselle*, a name anciently given to young ladies of noble or genteel extraction. The word, though an extremely elegant one, is now seldom used, except jocularly or in poetry.—*Damoisel*, or *damoiseau*, the masculine of the same word, appears to have been applied to young men of rank ; thus we read of *damsel Pepin*, *damsel Louis le gros*, *damsel Richard*, prince of Wales. From the sons of kings, this appellation first passed to those of great lords or barons, afterwards to those of gentlemen, who were not yet knights, and, at present (such is the progress of language), it is never used.

DANCE, or *dancing*, as at present practised, may be defined “ an agreeable motion of the body, adjusted by art to the measures or tune of instruments ;” but, according to what some reckon more agreeable to the true genius of the art, dancing is “ the art of expressing the sentiments of the mind, or the passions, by measured steps or bounds that are made in cadence, by regulated motions of the body, and by graceful gestures ; all performed to the sound of musical instruments or of the voice.” These definitions apply, properly, to two very dif-

ferent practices; the first is the ordinary dance; the second, the ballet-dance: the one an exercise, the other a performance. As an exercise, or amusement, artificial dancing is nothing more than a methodized act instinctive in the human frame. To teach dancing, is to teach the activity of the body to display itself in a manner regulated by principles of grace, or in imitation of steps and gestures which others have used with approbation. Dancing is a most salutary exercise. By its mechanical effects on the body, it inspires the mind with cheerfulness. The music which accompanies it, has effects upon the body as well as upon the mind. It is addressed through the avenue of the ears to the brain, the common centre of life and motion, whence its oscillations are communicated to every part of the system, imparting to each that equable and uniform vigour and action upon which the healthy state of all the functions depends. By the power of music, many remarkable cures, particularly of those disorders which are much connected with the nervous system, are known to have been performed. Dancing should not be used more than once or twice a week; nor should it even be continued till weariness comes on; nor should the dancer too soon encounter the cold air. If the dance is not performed under cover, motion should not be too suddenly discontinued. Dancing is usually an effect and indication of gaiety; but Pallesprat assures us, that there are nations in South America, who dance to express sorrow. It has been in use among every people, civil and savage, though held in esteem among some, and in contempt among others. Many ex-

amples may be adduced, ancient and modern, of its use in religious ceremonies.

DANCE, *Country*, is generally considered of English origin, though now transplanted into almost all the countries and courts of Europe ; but the name, seeming to imply a rustic way of dancing borrowed from country-people or peasants, is by some others supposed to be a corruption of the French, *contre-danse*, wherein a number of persons placing themselves opposite each other begin a figure. There is no established rule for the composition of tunes to this dance, because there is in music no kind of time whatever which may not be measured by the motions common in dancing.

DANCING, *rope*, or *wire*, walking, leaping, dancing, and performing various other feats, to the sound of music, upon a rope or wire, stretched across a stage at the height of five or six feet from the ground. The actions exhibited in this manner are often astonishing, and show, in connection with others, the extensive and versatile powers of the human frame. Every thing in the art depends upon the equilibrium preserved, and a degree of practice that removes all the obstacles of fear. The feet of the performer are chalked, to remedy the inconveniences of a smooth sole, and he is assisted in the preservation of his balance by a long pole. Suetonius, Seneca, and Pliny, mention elephants that were taught to walk on the rope.

DANE-GELT, a tax laid on every hide of land by the Danes, when they came over into this country, on our ancestors the Saxons, as the terms of peace and departure. It was first imposed as a continual yearly tax upon the whole nation under

king Ethelred: It was levied by William I and II, and finally abolished by king Stephen.

DANIEL, book of, in the Old Testament, contains a history of many things done in the Babylonian and Persian empires, as well as a prophecy of things to be done, and many calamities to be executed, with a final deliverance to the chosen people of God. The style of this book is neither so lofty nor figurative as that of the other prophets, it is more like that of an historian than of a prophet. Part of the book was originally written in the Chaldee language, and the rest in Hebrew. The Jews do not reckon Daniel among the prophets, because he lived the life of a courtier rather than that of a prophet, and because his revelations were not in the prophetic manner, but by dream and visions in the night, which they say is the very lowest degree of revelation. Christ, however, to whose authority Christians must ever submit, has decided the question by referring to him as a prophet, (see Matt. xxiv.) "Among the prophets," says the illustrious Newton, "Daniel is most distinct in order of time, and easiest to be understood; and, therefore, in things that relate to the last times, he must be made a key to the rest."

DATA, among mathematicians, a term used for such things and quantities as are given or known, in order to find other things therefrom, that are unknown. Euclid uses the word for such spaces, lines, and angles, as are of a given magnitude, or to which we can assign others equal.

DATE, in law, is the description of the day, month, or year of our Lord; and year of the reign of the king, in which a deed, or other writing was made.

DARE, the fruit of the *phœnix* or great palm-tree.

DATIVE, in grammar, the third, or one of the oblique cases in the declension of nouns, expressing the state or relation of a thing to whose profit or loss some other thing is referred. It is called *dative*, because usually governed by a verb implying something to be given to a person. In Latin the dative is distinguished by the termination of the word; in English, where there is, strictly speaking, no cases, the relation is expressed by the preposition *to* or *for*: thus, *amicus* (the nominative case) "a friend," *amico*; in English "to a friend," is the dative, or giving case.

DAUPHIN, the title of eldest sons or heirs apparent of the kings of France, from the time of Philip of Valois, who, in 1343, received the province of Dauphine from Humbert, dauphin of the Viennois, on condition that it should be so borne, to that of Lewis XVI. The dauphin, in his letters-patent, styled himself, "By the grace of God, eldest son of France, and dauphin of Viennois." By the late revolutions the title is entirely done away.

DAY, according to the most natural and obvious sense of the word, that space of time during which it continues to be light, in contradistinction to night, or the space of time which it is dark: but the period of light being somewhat vague and indeterminate, the time between the rising and the setting of the sun is usually spoken of as the day; and the time that elapses between its setting and its rising again, as the night. The day is divided into hours, and a certain number of days make a week, a month, or a year. The old Latin names for the

days of the week are still retained in the journals and proceedings of parliament, and also by physicians: these are dies Solis; dies Lunæ; Martis; Mercurii; Jovis; Veneris, and Saturni. The northerly nations have substituted for the Roman gods and goddesses, such of their own as most nearly resembled them in their peculiar attributes: thus the third day of the week, consecrated by the Romans to Mars, was named from the Scandinavian deity Tyr, in the Danish and Swedish language it is Tyrsdag, whence our Tuesday. Tyr was the god of war, among the nations of the north, as Mars was among the Romans. From Odin, or, as it was pronounced, Wodin, we derive Wednesday. Odin answered, according to Tacitus, to the Mercury of the Romans. Thursday is the day of Thor, the most formidable of the northern nations, answering to the dies Jovis of the ancients. The goddess Freya, from whom we derive our Friday, bears a still greater resemblance to Venus. The astronomical day, as we have already observed in the article Chronology, begins at noon, or when the sun's centre is on the meridian, and is reckoned twenty-four hours to the following noon. The astronomical day or the interval of time between two successive transits of the sun's centre over the meridian, is called likewise a solar day. See CHRONOLOGY.

Days of grace, in commerce, a customary number of days allowed for the payment of a bill after it becomes due. Three days of grace are allowed in England; ten in France and at Dantzic; eight at Naples; six at Venice, Amsterdam, Rotterdam, and Antwerp; four at Francfort; five at Leipsic;

twelve at Hamburg; six in Portugal; fourteen in Spain; and thirty at Genoa. See EXCHANGE.

DEACON, the lowest of the three orders of clergy (deacons, priests, and bishops) in the English church. The word is sometimes used in the New Testament for any one that ministers in the service of God; in which sense, bishops and presbyters are styled deacons: but, in its restrained sense, it is taken for the third order of the clergy, as appears from the concurrent testimony of ancient writers, who constantly stile them ministers of the mysteries of Christ, ministers of episcopacy and the church. In England, the form of ordaining a deacon declares that it is his office to assist in the distribution of the holy communion; in which, agreeably to the practice of the antient church, he is confined to the administration of the wine to the communicants. A deacon is not capable of any ecclesiastical promotion; yet he may be chaplain to a family, curate to a beneficed clergyman, or lecturer to a parish church. He may be ordained in the 23rd year of his age; but it is expressly provided, that no bishop shall ordain the same person a deacon and priest the same day. In Scotland, the deacon's office is only to take care of the poor.

DEAD. See DEATH.

DEAD men's-eyes, in sea-language, a kind of blocks, with many holes in them, but no sheevens, whereby the shrouds are fastened to the chains.

DEAD-reckoning, in naval affairs, the judgment or estimation which is made of a place where a ship is, without any observation of the heavenly bodies, and it is performed by keeping an account of her way by the log, in knowing the course which they

have steered by the compass, and by rectifying all the allowances for drift, lee-way, &c. according to a ship's known trim. This reckoning is always to be corrected as often as any good observation can be obtained.

DEAFNESS, the want of the sense of hearing, in a greater or less degree. Deafness generally arises either from an obstruction or depression of the auditory nerve; or from some collection of matter in the cavities of the inner ear; or from the auditory passage being stopped up by hardened excretion; or lastly, from some excrescence, or swelling of the glands, or some foreign body introduced.—Those born deaf are also dumb, as not being able to learn any language, at least in the common way: yet, as the eyes may in some measure serve them for ears, they may understand what is said, by the motion of the lips, tongue, hands, and by the general gesture of the speaker, and even accustom themselves to move their own, as they see others do, and by this means learn to express themselves. Thus Amman, a Swiss physician, residing at Amsterdam, effected surprising things of this kind, and reduced his method to a regular art, of which he published an account in the year 1692. Since that period, the names of Wallis and Braidwood have been known in the same pursuit; and the celebrity of the abbé de l'Epée, in France, is the foundation of baron von Kotzebue's impressive play, known in England by the name of *Deaf and Dumb*. We shall transcribe an extract from a work published by Messrs. Cadell and Davies, as explanatory of the method adopted by M. de l'Epée,

and which comprehends the leading principles of his scheme.

“ It is not by the mere pronounciation of words in any language that we are taught their signification: the words *door*, *window*, &c. in our own, might have been repeated to us hundreds of times in vain: we should never have attached an idea to them, had not the objects designated by these names been shown to us at the same time. A sign of the hand or of the eye has been the sole means by which we learned to unite the idea of these objects with the sounds that struck our ear. Whenever we heard these sounds, the same ideas arose in our minds because we recollected the signs made to us when they were pronounced.

“ Exactly similar must be our measures with the deaf and dumb. Their tuition commences with teaching them a manual alphabet, such as boys at school make use of to hold conversation at one end of a form with their companions at the other. The various figures of these letters strike forcibly the eyes of deaf and dumb persons, who no more confound them than we confound the various sounds that strike our ears.

“ We next write (I say *we*, because in the operations with my deaf and dumb pupils I frequently have assistance) in large characters with a white crayon upon a black table, these two words *the door*, and we shew them the door. They immediately apply their manual alphabet five or six times to each of the letters composing the word *door*, (they spell it with their fingers) and impress on their memory the number of letters and arrange-

ment of them; this done, they efface the word, and taking the crayon themselves, write it down in characters, no matter whether well or ill formed, afterwards they will write as often as you show them the object.

“ It will be the same with respect to every thing else pointed out to them, the name being previously written down, which being first on the table in large characters may afterwards be inscribed in characters of ordinary size upon different cards, and these being given to them, they amuse themselves in examining one another's proficiency, and ridicule those that blunder. Experience has manifested, that a deaf and dumb person possessing any mental powers, will acquire, by this method, upwards of eighty words in less than three days.

“ Take some cards, having suitable inscriptions, and deliver them one by one to your pupil, he will carry his hand successively to every part of his body conformably to the name on the card delivered to him. Mix and shuffle the cards; he will make no mistake, or if you choose him to write down any of these names on the table, you will see him in like manner distinguish with his finger every object whose name is so offered him, and thus clearly prove that he comprehends the meaning of every one.

“ By this process the pupil will obtain, in very few days, a knowledge of all the words which express the different parts of our frame, from head to foot, as well as of those that express the various objects which surround us; on being properly pointed out to him as you write their names down on the table, or on cards put into his hands.

"We are not, however, even in this early stage, to confine ourselves to this single species of instruction, amusing as it is to our pupils. The very first or second day we guide their hands to make them write down, or we write down for them ourselves, the present tense of the indicative mood to *carry*. Several deaf and dumb pupils being round a table, I place my new scholars on my right hand. I put the forefinger of my left hand on the word *I*, and we explain it by signs in this manner, showing myself with the fore-finger of my right, I give two or three gentle taps on my breast. I then lay my left fore-finger on the word *carry*, and taking up a large quarto volume I carry it under my arm in the skirts of my gown, on my shoulder, on my head and on my back, walking all the while with the mien of a person bearing a load. None of these motions escape his observation.

"I return to the table; and in order to explain the second person, I lay my left fore-finger on the word *thou*, and carrying my right to my pupil's breast, I give him a few gentle taps, making him notice that I look at him and that he is likewise to look at me. I next lay my finger on the word *carriest*, the second person, and having delivered him the quarto volume, I make signs for him to perform what he has just seen me perform: He laughs, takes the volume, and executes his commission extremely well. This method is adapted to the conception of the pupil in his progress through the intricacies of Grammar. The following description of the means of initiating him in a knowledge of the tenses of verbs will convey a sufficient idea

of the plan to general readers: The pupil, though deaf and dumb, had like us an idea of the past, the present, and the future, before he was placed under our tuition, and was at no loss for signs to manifest the difference.

“ Did he mean to express a present action? he made a sign prompted by nature, which we all make in the same case without being conscious of it, and which consists in appealing to the eyes of the spectators to witness the presence of our operation; but if the action did not take place in his sight, he laid his two hands flat upon the table, beating upon it gently as we are all apt to do on similar occasions, and these are the signs he learns again in our lessons, by which to indicate the present of a verb.

“ Did he design to signify that an action is past? He tossed his hand carelessly two or three times over his shoulder: these signs we adopt to characterize the past tenses of a verb.

“ And lastly when it was his intent to announce a future action, he projected his right hand: here again is a sign we give him to represent the future of a verb.

“ It is now time to call in art to the assistance of nature.

“ Having previously taught him to write out the names of the seven days of the week, one directly under another, we desire him to set them down in that order, and we then put on each side of his writing what follows before and after the same words under different heads.

Present.

To day—Sunday—I arrange nothing.

Imperfect.

Yesterday—Monday—I was arranging my books.

Perfect.

Day before yesterday—Tuesday—I arranged my chamber.

Past Perfect.

Three days ago—Wednesday—I had arranged my closet.

Future.

To-morrow—Thursday—I shall arrange my papers.

Future.

Day after to-morrow—Friday—I shall arrange my drawers.

Future.

Three days hence—Saturday—I shall arrange my cupboards.

“Yesterday, day before yesterday, three days ago, are explained by the number of times we have slept since the day of which we speak.

“To-morrow, day after to-morrow, three days hence, are explained by the number of times we are to sleep till the day in question arrive.

“We next teach our pupil to lay a restriction upon his motion. To express a thing past he used to throw his arm backwards and forwards towards his shoulder without rule: we tell him he must throw it only once for the imperfect, twice for the perfect, and three times for the past perfect, which in truth is analogous to what it signifies, the past perfect announcing an action longer past than the perfect, and the latter being in the same predicament with regard to the imperfect.”

DEAL, fir-planks of different thicknesses, brought from the Baltic, and much used in carpentry. Rods of deal expand gradually, or cross the grain, in moist weather, and contract again in dry; and thence have been found to make a useful hygrometer.

DEAN, an ecclesiastical dignity in cathedral or collegiate churches, and head of the chapter. As there are two foundations of cathedral churches in England, the old and the new, so there are two ways of creating deans. Those of the old foundation, established before the suppression of monasteries, as the dean of St. Paul's, London; of St. Peter's, York, &c. are raised to that dignity much in the same manner as bishops are raised to theirs, the king first sending his *congé d'elire*, the chapter electing, and the king granting his royal assent; when the bishop confirms the clergyman chosen, and issues his mandate for installation.—Those of the new foundation, whose deaneries were raised upon the ruins of the priories and convents, such as the deans of Canterbury, Durham, Ely, Norwich, Winchester, &c. are donative, and installed by virtue of the king's letters-patent, without either election or confirmation. There are cathedral churches which never had a dean, and in which the bishop is the head of the chapter, and in his absence, the arch-deacon: such are the cathedrals of St. David's and Llandaff. There are also deans without a jurisdiction, as dean of the chapel-royal. In this sense, the word is applied to the chief of certain peculiar churches or chapels.

DEAN and chapter: the bishop's council to assist him in the affairs of religion, and to assent to every

grant which the bishop shall make to bind his successors.

DEATH, the cessation of life. The extreme difficulty of defining what state of the animal economy is absolutely indicative of death, has occasioned the repetition of many salutary warnings against too hasty burial. The following are enumerated as the most certain signs or symptoms of death, when taken collectively. 1. Cessation of the pulse. 2. Total suppression of breathing. 3. Loss of animal heat. 4. Rigidity and inflexibility of the body and limbs. 5. Relaxation of the lower jaw. 6. Inability of the eye-balls to return to their sockets, when pressed by the finger. 7. Dimness and sinking of the cornea. 8. Foam in the cavity of the mouth. 9. Blue spots of various sizes, and on different parts of the body. 10. A cadaverous smell. 11. Insensibility to all external stimulants. These symptoms considered individually are far from conclusive, but when all or even the most of them concur at the same time, they afford the most certain criterion of death.

Men, says lord Bacon, fear death, as children fear the dark; and as that natural fear in children is increased by frightful tales, so is the other. Groans, convulsions, weeping friends, and the like, show death terrible; yet there is no passion so weak but conquers the fear of it, and therefore death is not such a terrible enemy; revenge triumphs over death; love slights it; dread of shame prefers it; grief flies to it; and fear anticipates it.

The alarms most prevalent among mankind, seem to arise from two considerations: 1. The sup-

passed corporeal suffering attending it; and II. The state that is to succeed it.

I. With respect to the supposed corporeal suffering, we should observe, 1. That death is a mere passive extinction of the vital fire, unattended with any exertion of the animal functions, and therefore wholly free from pain. The agonies, so much talked of, and the sufferings incident to sickness or wounds, are the agonies and sufferings of life, not of death; they are the struggles of the body to live, not to die; efforts of the machine to overcome the obstacles by which its functions are impeded. 2. It has often been suggested, and always with truth, that by-standers are much deceived by the appearance of pain in those who suffer it. Only a degree commensurate to the strength of the body can ever be endured;—this boundary passed, the victim, in the moment, swoons, and is relieved; or, by the continuance of an endurable pain, the sensibility of the nerves is destroyed. 3. We all suffer much more in parts of our lives than we can at the time of death. Severe torture may be experienced before death; but the period is that which precedes the dying state. 4. Death itself is either an instantaneous stoppage of life, or a gradual, languid, insensible fainting. In the case of drowning, for instance, much is said to be suffered; yet the pain is in the efforts of the body to live, not in its attempts to die, nor in struggles of the soul to separate, as some persons, however strangely, seem to imagine.

II. Of the state that follows death, what is here to be said refers entirely to the body, or rather to a corporeal view of the subject; for it is not to be

supposed that those who think of it with horror, doubt either the immortality of their souls, or the goodness of their Creator. They say that they shudder at the thought of being buried in the earth ; they shudder that their bodies should become subject to the laws by which matter is decomposed. These are thoughts on which it is the sickness of thinking to dwell. Life justly revolts from a condition so uncongenial with itself : but is it not absurd to perplex ourselves concerning personal evils that can never arrive while we have the power of feeling them ? Death is the end of life. It occupies no part of our existence. It is not an act that we are called upon to do. It cannot be an evil. A happy life is, indeed, desirable ; for life is ; but death is *not*. To talk of death, is to give a name to nothing. To part with life, is to part with that of which we can never regret the loss.

The death of those with whom we are acquainted, rationally afflict us ; not that we weep for them, but for ourselves. The affections are wounded. We feel a vacuum in our hearts. Persons sometimes die under circumstances peculiarly lamentable ; yet even here, our sorrow is the result of sentiment, rather than of judgment. There may be other causes for regretting the death of our friends ; but these are our own, not theirs.

To millions, who have missed, or been pushed out of, the path of enjoyment, death is the most desirable of events ; and why is it that in the personifications of this idea, every object is laid hold of to frighten " us poor fools of nature," rather than represent it to us in the figure of a mild and benevolent being, upon whose lap the head of the weary reposes.

Among the finest views that have been given of this, the following by Dr. Franklin, deserves, perhaps, to be ranked :—" WE are SPIRITS ;—that bodies should be lent us while they can afford us pleasure, assist us in acquiring knowledge, or doing good to our fellow-creatures, is a kind and benevolent act of God ; when they become unfit for these purposes, and afford us pain instead of pleasure, instead of an aid, become an incumbrance, and answer none of the intentions for which they are given, it is then equally kind and benevolent that a way is provided by which we may get rid of them : death is that way."

DEATH-watch, a little insect, famous for a ticking noise, like the beat of a watch, vulgarly and most falsely supposed to be a presage of death. There are two kinds of death-watches. The first is thus spoken of by Mr. Allen, in the Philosophical Transactions : it is a small beetle, 5-16ths of an inch long, of a dark brown-colour, spotted ; having transparent wings under the vagina, or hard case belonging to the beetle tribe, a large cap or helmet on its head, and two antennæ proceeding from beneath the eyes, and doing the office of proboscides. The part that it beats with, is the extreme edge of the face, which Mr. Allen calls the upper-lip, the mouth being protracted by this bony part, and lying underneath, out of view.—This account is confirmed by Dr. Derham, with this exception, that instead of ticking with the upper-lip, he observed the insect to draw back its mouth, and beat with its forehead. This author had two of these death-watches, which he kept alive several months ; and one of them he could bring to beat whenever he pleased, by imitating its beating. He concludes

from facts and observations which came under his notice that these pulsations are the methods made use of by these creatures to woo one another.

The second kind of death-watch is an insect in appearance quite different from the first : its colour is greyish, and it bears a general resemblance to the louse. The former only beats seven or eight strokes at a time, and quick ; the latter will beat some hours together without intermission, and the strokes are more leisurely, and like the beat of a watch. It is very common in all parts of a house in the summer-months ; nimble in running to shelter, and shy of being disturbed ; yet it beats freely before an observer, and is easily induced to answer a beating, if viewed without causing it molestation. Dr. Derham doubts whether it beats on any other substance, but he never heard their noise except in or near paper. Whether this insect changes its shape and becomes another animal or not, he could not say ; but he had reason to suspect that it changes into a sort of fly. The folly and weakness of those who consider the noise of this insect as indicative of approaching death in a family are well displayed by a poet of our own.

————— a wood-worm,
That lies in old wood, like a hare in her form ;
With teeth or with claws, it will bite or will scratch,
And chambermaids christen this worm a death-watch :
Because like a watch it always cries click :
Then woe be to those in the house who are sick,
For sure as a gun, they will give up' the ghost,
If the maggot cries click, when it scratches the post.

DE BENE ESSE', a Latin phrase used in our law, expressing a doubtful approbation ; as to take or do a thing *de bene esse*, is to allow it to be for the

present well done ; but when it comes to be more fully examined, then to stand or fall according to the merit of the thing.

DRAWBENTURE, a term of trade used at the custom-house, for a kind of certificate signed by the officers of the customs, which entitles a merchant exporting goods to the receipt of a bounty or drawback.

DEBT, National, the engagement entered into by a government to repay at a future period money advanced by individuals for public service, or to pay the lenders an equivalent annuity. The persons who lend the money which government has occasion to borrow generally make a profit of it, but nothing is brought into the country, nor the least addition made to its total wealth by a transaction of this kind ; whatever therefore is gained by any individual concerned in it, must be taken from others, and as those who lend the money are persons already in possession of property, and those from whom the sums are requisite for paying the interest, are the public at large, it is evident that all transactions of this nature contribute to encrease the existing disparity of the different classes of the community, and consequently that the natural tendency of the funding system is to destroy the intermediate ranks, and divide a nation into two classes only, as unequal in number, as in circumstances, of very rich, and miserably poor. It may, however, be carried to a very great extent, without fully producing this effect, if counteracting circumstances exist sufficiently powerful to dissipate the gains of the rich nearly as fast as they are acquired, and thus prevent a rapid accumulation of wealth. This has been the case of Great Britain, for the

increase of expences has prevented the wealthy from becoming so enormously rich as they otherwise would have been; still they are possessed of more property and larger incomes than the wealthy members of the community at any former period, and the number of poor is considerably augmented.

The great expences attending the modern system of warfare appears to have created the necessity of national debts, the practice originated in Italy, and was soon adopted in other countries, but it has been brought into a more regular system and carried to a much greater extent in Great Britain than in any other nation. It commenced in the reign of William III. The war which began in 1689 being very expensive, and the grants of parliament not supplying money so fast as it was wanted, the expedient of mortgaging part of the public revenue was adopted. At first the produce of particular taxes was assigned for repayment of the principal and interest of the money borrowed, large sums were also raised on life annuities, and annuities for terms of years, and the fund established for the payment of these debts, being generally inadequate to the charge upon them, occasioned great deficiencies which at the conclusion of the war amounted to upward of five millions sterling. In 1697 the debt amounted to nearly 20 millions. In 1716 it amounted to 48 millions, which was mentioned in the king's speech as an insupportable burden, and the government thought it necessary to concert such measures as might lay the foundation of an effectual plan for its reduction. In consequence of this disposition all the existing taxes excepting the *land* and *malt*, were made perpetual, and having been distributed into three classes,

called the aggregate, south-sea, and general funds, the surplusses remaining after satisfying the previous charges upon these respective funds were formed into a sinking fund, for the express purpose of discharging the principal and interest of such debts and incumbrances as had been previously incurred. See SINKING-FUND. The total amount of the national debt at the commencement of the seven years war in 1756 was 75 millions nearly, and at the end of that war it was increased to upwards of 136 millions. By the American war the debt was increased to 252 millions, which, however, in 1792, previously to the war with France, was reduced to 238 millions; from that period to Midsummer 1807 it was increased to the enormous sum of - - - - - £ 756,033,231 11s. 5½d.

Redeemed by the com- missioners for paying off the National Debt	}	117,581,858 0 0
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Total unredeemed debt £ 638,451,373 11s. 5½d.

The interest and expences of management upon this vast sum amount to more than 22 millions sterling annually, which sum must be raised by taxes independently of those which are called for as the current expences of government. See FUNDS
LOANS, &c. &c.

DECA, "ten," begins many words employed in the English language, as

DECAGON, in geometry, a plain figure with ten sides and ten angles.

DECALOGUE, the ten precepts and commandments delivered by God to Moses, engraved on two tables of stone. The Jews, by way of excellence, call these commandments The Ten Words, whence they afterward received the name of *decalogue*. This

people join the first and second into one, and divide the tenth into two.

DECEMBER, in chronology, the last month of the modern year, consisting of thirty one days, and so called as being the tenth month in the Roman year, which began with March.

DECEMVIRI, ten magistrates, elected by the Roman people, and invested with the power of administering the laws of the twelve tables, which were compiled at the time of their creation. The decemviri were introduced by the popular power to counteract the privileges of the patricians; but their misbehaviour caused the same power to procure their abolishment in the third year of their existence.

DECIDUOUS, an epithet chiefly used in Botany. 1. The calyx or cup of a flower is said to be *deciduous* when it falls, or decays, along with the flower-petals, while on the contrary, it is called *permanent* when it remains after these are fallen. 2. *Deciduous* leaves are those which fall in autumn, in contradistinction to those of ever-greens. 3. *Deciduous* may be applied to the general port of a shrub or tree when its branches *fall*, as those of some kinds do, in a loose, graceful manner.

DECIMAL-arithmetick, the art of computing by decimal fractions. **Decimal fraction**, a fraction the denominator of which is always 1, with one or more cyphers:—Thus, a unit may be imagined to be equally divided into ten parts, and each of these into ten more; so that by a continual decimal subdivision, the unit may be supposed to be divided into 10, 100, 1000, &c. equal parts, called tenth, hundredth, and thousandth parts of a unit.

In decimal fractions, the figures of the numerator are only expressed, the denominator being omitted, because it is known to be always an unit with so many cyphers as there are places, in the numerator. 2. A decimal fraction is distinguished from an integer with a point prefixed, as .2 for $\frac{2}{10}$, .34 for $\frac{34}{100}$, .567 for $\frac{567}{1000}$, &c. The same is observed in mixed numbers, as 678.9 for $678\frac{9}{10}$, 67.89 for $67\frac{89}{100}$, 6.789 for $6\frac{789}{1000}$, &c. Cyphers at the right hand of a decimal fraction alter not its value; for .5 or .50 or .5000 are all equal to $\frac{5}{10}$ ths or $\frac{1}{2}$. But cyphers on the left hand in a decimal decrease the value in a tenfold proportion, for .05 is $\frac{5}{100}$ and .005 = $\frac{5}{1000}$. As the denominator of a decimal is always one of the numbers 10, 100, 1000, &c. the inconvenience of writing those denominators down may be saved, by placing a proper distinction before the figures of the numerator only, to distinguish them from integers, for the value of each place of figures will be known in decimals, as well as in integers, by their distance from the first or unit's place of integers, having similar names at equal distances as appears by the following scale of places, both in decimals and integers:

&c. 6 6 6 6 6 6 6 . 6 6 6 6 6 6 &c.

millions	units	tenths
hund. of thousands	tens	hundredths
tens of thousands	hundreds	thousandths
thousands		ten thousandths
hundreds		hund. thousandths
tens		millionths
units		

Decimal fractions are easily reduced into a common denominator, by making, or even supposing, all of them to consist of the same number of places ; so .8, .45, .067, .0089, may be written thus .8000, .4500, .0670, .0089; all which consisting of four places, their common denominator is an unit with four cyphers, namely, 10000. Addition and subtraction of decimals are the same as in whole numbers, when the places of the same denomination are set under one another, as in the following examples :

To 35.76	From - 18.45
Add 2.487	Take - 864
<hr style="width: 100px; margin: 0 auto;"/> Sum 38.247	<hr style="width: 100px; margin: 0 auto;"/> Different 17.586

In multiplication the work is the same as in whole numbers ; only in the product, separate with a point, so many figures to the right hand as there are fractional places both in the multiplicand and multiplier : then all the figures on the left hand of the point make the whole number, and those on the right a decimal fraction ; thus

Ex. 1. Mult. 4.53	Ex. 2. .342
by 4.6	- .005
<hr style="width: 100px; margin: 0 auto;"/>	<hr style="width: 100px; margin: 0 auto;"/>
2718	.001710
1812	<hr style="width: 100px; margin: 0 auto;"/>
<hr style="width: 100px; margin: 0 auto;"/>	
20.838	

If there be not so many figures in the product, as ought to be separated by the preceding rule, then, as in example 2, place cyphers at the left to complete the number. In division the work is the

same as in whole numbers; only in the quotient, separate with a point, so many figures to the right hand, for a decimal fraction, as there are fractional places in the dividend, more than in the divisor, because there must be so many fractional places in the divisor and quotient together, as there are in the divisor; thus if the sum be

$$34.3)730.615 \text{ (32.12)}$$

after the divisions, as in whole numbers, I find there are 3 decimal places in the dividend and one in the divisor, therefore by the rule there must be two decimals in the quotient. Vulgar fractions are reduced to decimals of the same value, by dividing the numerator by the denominator thus $\frac{1}{2} = \frac{1.0}{2} = .5$, $\frac{3}{4} = \frac{3.00}{4} = .75$ and so on.

DECRYPTION, the art of discovering the purport of a writing, without a previous knowledge of the character or cypher in which the letters of the alphabet are expressed. See **CYPHER**.

Deck of a ship, a planked floor from stem to stern, upon which the guns lie, and the men walk to and fro. Great ships have three decks, first, second, and third, beginning to count from the lowermost.

DECLAMATION, the act of speaking to a public audience with energy and grace. Declamation is a natural act, not an artificial acquisition. It must be produced by natural feeling, be graceful through taste, or the innate sense of congruity, and be excited by real occasion. Art has nothing more to do than to correct bad habits. Criticism points out what is elegant or sublime, and what otherwise.

DECLAMATION, is a term often applied to language in a contemptuous sense: the reason is, a very strong appeal to the passions may be wholly deficient in basis. It may gain the assent of the feelings without offering a single argument that is worthy of the understanding. Declamation makes assertions without offering proofs; it can even condescend to rest its cause upon prejudices that it despises; it lays hold of every allusion that can inflame, and every word and turn of expression that can seduce its hearer: a poetical effusion, it flies from logical analysis; it assumes the character of truth, and demands belief, not invites examination.

DECLARATION of war, a public proclamation made by a herald at arms to the subjects of a state, declaring them to be at war with some foreign power, and forbidding all and every one to aid or assist the common enemy at their peril.

DECLENSION, in grammar, an inflection of nouns according to their divers cases, as nominative, genitive, dative, &c. In languages, the nouns of which admit of declensions, the peculiar application of a name or word is thus pointed out by its termination; but in the English, and other modern tongues, there are not, properly, any cases or declensions, their absence being supplied by articles: as *a, the, of, to, &c.*

DECLINATION, the distance of any celestial object from the equinoctial, either north or south: or the perpendicular distance of the said object from the equator. See **GLOBES**, use of.

DECOCTION, is a very useful way of extracting the soluble and efficacious part of many drugs, particularly of barks, woods, seeds, roots, &c. The

three decoctions most used in medicine are those of *Bark*, *Sarsaparilla*, and *Barley*.

DECOCTION of *Bark*. Take of Peruvian bark grossly powdered, one ounce ; water one pint and a half. Boil these for ten minutes in a covered vessel, and strain while hot.

DECOCTION of *Sarsaparilla*. This is likewise called the Decoction of Woods : take of sarsaparilla, cut and bruised, six ounces ; sasafra wood, the shavings of guaiacum, and liquorice root, of each one ounce ; mesereon root, three drachms ; water, five pints. These are to be macerated over a slow fire for six hours, and the liquor afterwards to be reduced by boiling to five pints.

DECOCTION of *Barley* : Take of pearl barley two ounces ; distilled water four pints. First wash the barley with cold water, then pour upon the barley about half a pint of water, and boil it a little. This is to be thrown away, and the distilled water is to be added in the boiling state, and to be boiled till the four pints are reduced to about two.

DECOMPOSITION, in chemistry, usually signifies the disunion or separation of the constituent parts of bodies.—It differs from mere mechanical division, in that when a body is decomposed, the parts into which it is resolved are essentially different from the body itself ; but, though a mechanical force is applied to it ever so long, or with ever so much violence, the minutest particles into which the body may be reduced, still retain their original nature.

DECOY, in naval affairs, a stratagem employed by a ship of war, to betray a vessel of inferior force into an incautious pursuit, till she has drawn her.

within the range of her cannon, or what is called within *gun-shot*. . . It is usually performed by painting the stern and sides in such a manner as to disguise the ship, and represent her either much smaller and of inferior force than she really is, or a friend to the hostile vessel which she endeavours to ensnare. Decoying is also performed to elude the chase of a ship of superior force in a dark night ; and this is done by committing to the sea a lighted cask of pitch, which will burn for a considerable time, and misguide the enemy. As soon as the cask is lowered, the ship changes her course, and thus escapes with facility, if at any tolerable distance from the foe.

Decoy, among fowlers, a place for catching wild-fowl, generally contrived where there is a large pond surrounded with wood, and beyond that a marshy and uncultivated country. The means of decoy are a number of ducks, trained to the habit of alluring the wild ones of their species to follow them into such inclosures, that, on the appearance of the decoy-man, they drive, through terror, into a purse net, when they are secured. The general season for catching fowls in decoys, is from the latter end of October to February.

Decree, the order of an authoritative power. In England, the sentence of the judges in the civil courts, and in chancery, is called a decree.

Decrepitation, in chemistry, a term applied to the crackling noise of salts exposed to heat, by which they are quickly split. It takes place in those salts that have little water of crystallation, the increased temperature converting that small quantity into vapour, by which the crystals are sud-

denly burst. Common salt affords a good example of decrepitation, and when used as a flux should be previously decrepitated.

DECRETAL, in the common law, a letter from the pope, determining some point or question in ecclesiastical polity.

DECOUPLE proportion, that of ten to one.

DEFAMATION, the offence of speaking slanderous words of another ; and where any person circulates a report injurious to the credit or character of another, the party injured may bring an action to recover damages proportioned to the injury he has sustained, but he must prove that he has sustained an injury to entitle him to damages ; in some cases, however, as for words spoken which by law are in themselves actionable, as calling a tradesman a bankrupt, cheat, &c. there is no occasion to prove any particular damage, but the plaintiff must be particularly attentive to state words precisely as they were spoken, otherwise he will be nonsuited.

DEFINITION, the shewing the meaning of one word by several others which are not synonymous : the special rules for a good definition are these : 1. A definition must be universal, or adequate, that is, it must agree to all the particular species, or individuals that are included under the same idea. 2. It must be proper, and peculiar to the thing defined, and agree to that alone.

These two rules being observed, will always render a definition reciprocal with the thing defined, that is, the definition may be used in the place of the thing defined ; or they may be mutually affirmed concerning each other. 3. A definition should be clear and plain ; and indeed it is

a general rule concerning the definition both of names and things, that no word should be used in either of them which has any difficulty in it, unless it has been before defined. 4. A definition should be short, so that it must have no tautology in it, nor any words superfluous. 5. Neither the thing defined, nor a mere synonymous name, should make any part of the definition.

DEFLAGRATION, the act of burning two or more substances together, as charcoal and nitre. When a quantity of nitre (nitrate of potash) is mixed with an equal weight of sulphur or charcoal, and the mixture is thrown into a crucible heated to redness, a vivid combustion is instantly excited. This is **deflagration**: which is thus explained, nitre is a compound of nitric acid and potash. The nitric acid consists of nitrogen and oxygen, the oxygen is separated by exposure to the red heat, and being suddenly presented to an inflammable body, a vivid combustion is excited, the affinity of the inflammable body to the oxygen of the nitre will cause a decomposition of the substance at even a lower temperature than a red heat. The nitrogen passes off in the state of gas, and the potash with which the acid was united remains united with the body formed by the combination of the oxygen and the inflammable substance.

DEGREE, in Geometry, a division of a circle, including a three hundred and sixtieth part of its circumference: every circle is supposed to be divided into three hundred and sixty parts, called degrees, and each degree divided into sixty other parts, called minutes; each of these minutes being again divided into sixty seconds, and each second into

thirds, and each third into fourths, and so on. . . By this means no more degrees or parts are reckoned in the greatest circle than in the least, and therefore if the same angle at the centre be subtended by two concentrical arches, as many degrees are counted in the one as in the other ; for these two arches have the same proportion to their whole peripheries.

DEGREE, in Universities, denotes a quality conferred on the students or members thereof as a testimony of their proficiency in the arts or sciences, and intitling them to certain privileges. The degrees are bachelor, master, and doctor : instead of which last, in some foreign universities, they have licentiates. In each faculty, there are two degrees, bachelor and doctor, which were anciently called bachelor, and master. In the arts likewise there are two degrees which still retain the ancient denominations, viz. bachelor, and master.

DEISTS, in the modern sense of the word, are those persons in Christian countries, who, acknowledging all the obligations and duties of natural religion, disbelieve the Christian scheme, or revealed religion. They are so called, in opposition to Christians, from their belief in God alone. The learned Dr. Clarke, taking the denomination in the most extensive signification, distinguishes deists into four sorts, 1. Such as pretend to believe the existence of an eternal, infinite, independent, intelligent Being, and who teach that this supreme Being made the world, though they fancy he does not at all concern himself in the management of it. 2. Those who believe not only the being, but also the providence of God, with respect to the natural

world; but who not allowing any difference between moral good and evil, deny that God takes any notice of the morally good or evil actions of men; these things depending, as they imagine, on the arbitrary constitutions of human laws. 3. Those who having right apprehensions concerning the natural attributes of God, and his all-governing providence, and some notion of his moral perfections also; yet, being prejudiced against the notion of the immortality of the human soul, believe that men perish entirely at death, and that one generation shall perpetually succeed another, without any future restoration or renovation of things. 4. Such as believe the existence of a supreme Being, together with his providence in the government of the world, the reality of right and wrong, and the immortality of the soul; but so far only, as these things are discoverable by the light of nature; without any other divine revelation. These last are the only true deists; but as, in his opinion, the principles of these men should lead them to embrace the Christian revelation, the learned author concludes there is now no consistent scheme of deism in the world.

DEITY, a term frequently used in a synonymous sense with God. See God.

DELFT ware, a kind of pottery of baked earth covered with an enamel of white glazing which gives it the appearance and neatness of Porcelain; which see.

DELIQUESCENCE, in chemistry, a term applied to certain saline bodies that have become moist or liquid, by means of the water which they absorb from the atmosphere, in consequence of their great

attraction to water. When the salt has, by exposure to air, become so far deliquesced as to be in a liquid state, it is said to be in the state of deliquium. Hence alkali, reduced by this means to a liquid state, was formerly denominated "oil of tartar *per deliquium*."

DELPHINUS, the dolphin, a genus of fishes, containing several species; among these the porpesse, is the most abundant of the cetaceous animals. Porpesses are gregarious, and are frequently seen frolicking on the water, and playing their uncouth gambols, more especially on the approach of boisterous weather. They feed on smaller fishes, and are themselves very fat, and produce large quantities of oil. They were once considered as a species of luxury at the tables of the great, but are never seen there now. The dolphin is a very large fish, measuring sometimes ten feet in length. It is found both in the Pacific and European seas, and its appearance is in general preliminary to a tempest. It not only pursues and attacks small fish, on which indeed, it subsists, but assails the whale itself, and is stated to have been seen firmly adhering to whales as they have leaped from the water. The ancients appear to have had almost a superstitious attachment to this animal, and relate various anecdotes of it, implying a peculiar susceptibility of gratitude and affection, a strong attachment to mankind, and a rapturous fondness for music.

DELUGE, an inundation covering the earth either in the whole or in part. In history we find accounts of several deluges, as that in the time of Deucalion, which overflowed Thessaly in the year

before Christ 1599. The deluge of Ogyges, which happened 300 years before that of Deucalion. Of a similar kind were those inundations in the Netherlands which, in 1727, overwhelmed and covered with the sea all that part now called the gulf Dollart in the United Netherlands, and in 1421 all that country situated between Brabant and Holland; but the most memorable deluge is that which by way of eminence is called The universal Deluge or Noah's Flood, recorded in Scripture as a general inundation sent by God to punish the corruption and wickedness of the world. This flood makes one of the most considerable epochas in chronology. Its history is given by Moses in the book of Genesis, ch. vi & vii. and its time is fixed to the year from the creation 1656. From this flood, the state of the world is divided into "diluvian" and "anti-diluvian."

DEMAIN, or *demesne* in law, is commonly understood to be the lord's chief manor-place, with the lands thereunto belonging, which he and his ancestors have time out of mind kept in their own manual occupation, for the maintenance of themselves and their families.

DEMAIN denotes also all the parts of any manor not in the hands of freeholders; and is frequently used for a distinction between those lands that the lord of the manor has in his own hands, or in the hands of his lessee demised at a rack-rent; or such other land appertaining to the manor, which belongs to free or copyholders.

DEMAIN is sometimes taken in a more special sense, as opposite to frank-fee; such lands as were in possession of Edward the Confessor, being

called ancient demesne, and all others frank-fee. In England, no private person has any demesnes, according to the simple acceptation of the word, because there is no land but what depends mediately or immediately upon the crown, as of some honour belonging to it, and not granted in fee to an inferior person; wherefore when a person pleading would signify the land to be his own, he says, that he is seized thereof in his demain as of fee; by which it appears, that though his land be to him and his heirs for ever, yet it is not true demesne, but depending upon a superior lord, and is held by rent or service.

DEMESNE. See DEMAIN.

DEMISE, in law, is applied to an estate either in fee, for term of life or years, though most usually the latter. The king's death in law is termed the demise of the king, which does not discontinue any writ or process, nor determine any commission, civil or military, nor a parliament till after six months.

DEMOCRACY, a government, wherein the supreme power is lodged in the hands of the people: such were Rome and Athens of old: as to modern republics, Basil only excepted, their government comes nearer to aristocracy than democracy; and this must always perhaps be the case.

DEMURRAGE, in commerce, an allowance made to the master of a ship by the merchants, for staying in a port longer than the time first appointed for his departure.

DEMURRER, in law, a stop put to any action upon some point of difficulty, which must be determined by the court, before any farther proceedings can be

had in the suit. Demurrers are either general, without showing any particular cause; or special, where the causes of it are particularly assigned; and one may not pray the judgment of the court on an insufficient declaration or plea, otherwise than by demurrer, when the matter comes judicially before them. In pleadings, if a matter is insufficiently alleged, that the court cannot give judgment thereon, a general demurrer will suffice, and so for want of substance in any plea, &c. but if there be any want of form, it is required that there be a special demurrer.

DENDRITES, or Arborizations. This appellation is given to figures of vegetables which are frequently observed in fossil substances. They are of two kinds; the one superficial the other internal. The first are chiefly found on the surface of stones, between the strata, and in the fissures of those of a calcareous nature.

DENIZEN, in law, an alien made a subject by the king's letters-patent, otherwise called donaison; because his legitimization proceeds *ex donatione regis*, from the king's gift. A denizen is enabled in several respects to act as natural subjects do, viz. to purchase and possess lands, and enjoy any office or dignity; yet it is short of naturalization: for a stranger, when naturalized, may inherit lands by descent, which a denizen cannot do. If a denizen purchase lands, his issue that are born afterward may inherit them, but those he had before shall not; and as a denizen may purchase, so he may take lands by devise.

DENOMINATOR, in arithmetic, a term used in speaking of fractions. The denominator of a frac-

tion in the number below the line, showing into how many parts the integer is supposed to be divided. Thus, in the fraction $\frac{1}{4}$, the number 4 shows that the integer is divided into four parts. So in the fraction $\frac{a}{b}$, b is the denominator.

DENSITY, of bodies, is that property directly opposite to rarity, whereby they contain such a quantity of matter under such a bulk.

A body is said to have double and triple the density of another body, when being equal, the quantity of matter is in one double or triple the quantity of matter in the other. The densities and magnitudes of bodies, are the two great points upon which all mechanics and laws of motion turn.

Density of the planets. In homogeneous, unequal, spherical bodies, the gravities on their surfaces are as the diameters, if the densities are equal. But if the bodies be equal, the gravities will be as the densities. Therefore, in bodies of unequal bulks and densities, the gravity will be in a compound-ratio of the diameters and densities. Consequently, the densities will be as the gravities divided by the diameters, and therefore in the several bodies as follows :

In the Sun. Herschel. Jupiter. Saturn. Earth.

1.0000. 1.3757 .8601 .4951 3.9393

As it is not likely that these bodies are homogeneous, the densities here determined are not to be supposed the true, but rather the mean definitives, or such as the bodies would have if they were homogeneous, and of the same mass of matter and magnitude.

DENSITY of air, it is found by experiment that the density of the air is the greatest at the earth's

surface, and that it decreases upwards in geometrical proportion, to the altitudes taken in an arithmetical ratio.

DENTIFRICE, a remedy for the teeth, or a substance used for cleaning them and keeping them in good order : one of the best is said to consist of equal parts of myrrh, charcoal, roach alum and bark, finely pulverized.

DEODAND, in English polity, a thing devoted or consecrated to God, for the pacification of his wrath, in case of any misfortune, as a person's coming to a violent end, without the fault of any reasonable creature ; as if a horse should strike his keeper, and so kill him. In this case, the horse is to be a deodand ; that is, he is to be sold, and the price distributed to the poor, as an expiation of that dreadful event.

DEPHLOGISTICATED, a term applied by Dr. Priestley, and others, to what is now called oxygen gas, when he first discovered it. It was denominated by Scheele, who discovered it about the same period, vital air.

DEPRESSION, of the sun, or a star, in astronomy, is its distance at any time below the horizon, measured by an arc of a vertical circle.

DEPRESSION of the pole ; When a person sails or travels towards the equator he is said to depress the pole, because as many degrees as he approaches nearer the equator, so many degrees will the pole be nearer the horizons. This phenomenon arises from the spherical figure of the earth. The altitude or depression of any star is measured by an arc of the vertical intercepted between the horizon and that star.

DEPRIVATION, is an ecclesiastical censure, whereby a clergyman is deprived of his living. The causes of deprivation, are open notorious vices : or ignorance ; or by having obtained preferment before the proper age or by simoniacal contract.

DERVIS, a name given to all Mahometan monks, though of various orders. Many of the dervises travel over the whole Mahometan world, entertaining the people wherever they come, with agreeable relations of all the curiosities they have met with. There are dervises in Egypt, who live with their families, and exercise their trades, of which kind are the dancing dervises at Damascus. They are distinguished among themselves by the different forms and colours of their habits ; those of Persia wear blue ; the solitaries and wanderers wear only rags of different colours ; others carry on their heads a plume, made of the feathers of a cock ; and those of Egypt wear an octagonal badge of a greenish white alabaster at their girdles, and a high stiff cap without any thing round it.

DESERT, a large extent of country, intirely barren, and producing nothing. In this sense, some are sandy deserts, as those of Lop, Xamo, Arabia, and several others, in Asia ; in Africa, those of Lybia and Zaara : others are stony, as the desert of Pharan, in Arabia Petrea. " The Desert," absolutely so called, is that part of Arabia south of the Holy-land, where the children of Israel wandered forty years.

DESIGN, in the manufactories, expresses the figures with which workmen enrich their stuff or silk, and which they copy after some draughtsman, as in diaper, damask, and other flowered silk, tapes-

try, &c. Every piece being composed of several repetitions of the same design, when the whole design is drawn, the drawer, to rebegin the design afresh, has nothing to do but to raise the little strings, with slip knots, to the top, and this he is to repeat as often as is necessary till the whole be manufactured.

DESIRE, may be considered as an eager longing for some apparent good, centered in particular objects, situations or circumstances:—or as that uneasy sensation excited in the mind by the view or contemplation of any desirable good, which is not in our possession, which we are solicitous to obtain, and of which the attainment appears at least possible.

DESPAIR, is a permanent fear of losing some valuable good, of suffering some dreadful evil, or of remaining in a state of actual misery, without any mixture of hope. It generally succeeds to ineffectual efforts, which have been repeatedly made, and of consequence is excited where no means can be devised equal to the magnitude of the supposed evil.

DETERENTS, in clock-work, are those stops, which, by being lifted up or let down, lock or unlock the clock in striking.

DETONATION, in chemistry, an explosion with noise, made by the inflammation of a combustible body. Decrepitation differs from detonation only as producing a fainter noise, or merely a kind of crackling sound peculiar to certain salts. Fulmination is a more quick and lively detonation, such as takes place with certain preparations of gold, silver, mercury, &c.

DEUTERONOMY, one of the sacred books of the Old Testament, and so called because this last part of the work of Moses, comprehends a recapitulation of the law he had before delivered to the Israelites himself. It is called by the Rabbins the "second law:" also the book of "reprimands," on account of the twenty-eighth chapter, which is full of blessings promised to such as keep the law, and of curses threatened to such as transgress it. This book contains 34 chapters, of which the last could not have been written by Moses; some suppose that Joshua was the author of this chapter, and others maintain that it was written by Ezra, who made some interpolations in the book itself.

Dew, a dense moist vapour, falling on the earth in form of a misting rain, while the sun is below the horizon. See METEOROLOGY.

DEY, in matters of government, the sovereign prince of Algiers, answering to the bey of Tunis. See BEG.

DIADELPHIA, in the Linnæan system of botany, a class of plants, the seventeenth in order; comprehending all those with papilionaceous and hermaphrodite flowers, and leguminous seed-vessels. The distinguishing characteristic of this class is, that the stamina adhere together; forming two dissimilar bodies or filaments, the one standing above the pistil, and the other surrounding it. This class comprehends pease, beans, vetches, liquorice, and many other genera.

DIADEM, in antiquity, a head-band, or fillet, worn by kings, as a badge of royalty. It was made of silk, thread, or wool, tied round the temples and forehead, the ends being tied behind, and let fall on

the neck. It was usually white, and quite plain, though sometimes embroidered with gold, and set with pearls and precious stones. In later times, it came to be twisted round crowns, laurels, &c. and even appears to have been worn on divers parts of the body.

DIAGONAL, in geometry, a right line drawn across a quadrilateral figure from one angle to another, by some called the diameter of the figure. It is demonstrated in geometry, " 1. That every diagonal divides a parallelogram into two equal parts, 2. That two diagonals drawn in any parallelogram, divide the figure into equal parts. 3. That the sum of the squares of the two diagonals of every parallelogram is equal to the sum of the squares of the four sides. 4. In any trapezium, the sum of the squares of the four sides is equal to the sum of the squares of the two diagonals, together with four times the square of the distance between the middle points of the diagonals. 5. In any trapezium, the sum of the squares of the two diagonals is double the sum of the squares of two lines bisecting the two pairs of opposite sides. 6. In a quadrilateral inscribed in a circle, the rectangle of the two diagonals is equal to the sum of the two rectangles under the two pairs of opposite sides.

DIAL, or sun-dial, is a plane, upon which lines are described in such a manner, that the shadow of a wire, or of the upper edge of a plate stile, erected perpendicularly on the plane of the dial, may show the true time of the day. The edge of the plate by which the time of the day is found, is called the stile of the dial, which must be parallel to the earth's axis; and the line on which the said plate is erected,

is called the substile. The angle included between the substile and stile, is called the elevation, or height of the stile.

Those dials, whose planes are parallel to the plane of the horizon, are called horizontal dials; and those dials whose planes are perpendicular to the plane of the horizon, are called vertical or erect dials.

Those erect dials, whose planes directly front the north or south, are called direct north or south dials; and all other erect dials are called decliners, because their planes are turned away from the north or south.

Those dials, whose planes are neither parallel nor perpendicular to the plane of their horizon, are called inclining or reclining dials, according as their planes make acute or obtuse angles with the horizon.

The intersection of the plane of the dial, with that of the meridian, passing through the stile, is called the meridian of the dial, or the hour-line of XII.

Those meridians, whose planes pass through the stile, and make angles of 15, 30, 45, 60, 75, and 90 degrees with the meridian of 'the place' (which marks the hour-line of 12,) are called hour-circles; and their intersections with the plane of the dial, are called hour-lines.

In all declining dials, the substile makes an angle with the hour-line of XII; and this angle is called the distance of the substile from the meridian.

The declining plane's difference of longitude, is the angle formed at the intersection of the stile and

plane of the dial, by two meridians; one of which passes through the hour-line of XII, and the other through the substile.

We shall now proceed to explain some of the different principles of their construction.

“The universal principle on which dialling depends.”—If the whole earth $a P p$ (Plate Dial fig. I) were transparent and hollow, like a sphere of glass, and had its equator divided into twenty-four equal parts by so many meridian semicircles, a, b, c, d, e, f, g , &c. one of which is the geographical meridian of any given place, as London (which is supposed to be at the point a); and if the hours of XII were marked at the equator, both upon that meridian and the opposite one, and all the rest of the hours in order on the rest of the meridians, those meridians would be the hour-circles of London: then, if the sphere had an opaque axis, as $P E p$, terminating in the poles P and p , the shadow of the axis would fall upon every particular meridian and hour, when the sun came to the plane of the opposite meridian, and would consequently shew the time at London, and at all other places on the meridian of London.

“Horizontal Dial.”—If this sphere was cut through the middle by a solid plane $A B C D$, in the rational horizon of London, one half of the axis $E P$ would be above the plane, and the other half below it; and if straight lines were drawn from the centre of the plane, to those points where its circumference is cut by the hour-circles of the sphere, those lines would be the hour-lines of a horizontal dial for London: for the shadow of the axis would fall upon each particular hour-line of

the dial, when it fell upon the like hour-circle of the sphere.

“Vertical Dials.”—If the plane which cuts the sphere be upright, as *A F C G* (fig. 2), touching the given place (London) at *F*, and directly facing the meridian of London, it will then become the plane of an erect direct south dial; and if right lines be drawn from its centre *E*, to those points of its circumference where the hour-circles of the sphere cut it, these will be the hour-lines of a vertical or direct south dial for London, to which the hours are to be set as in the figure (contrary to those on a horizontal dial); and the lower half *E p* of the axis will cast a shadow on the hour of the day in this dial, at the same time that it would fall upon the like hour-circle of the sphere, if the dial-plane was not in the way.

“To construct a Horizontal Dial by the globe.”—Elevate the pole to the latitude of your place, and turn the globe until any particular meridian (suppose the first) comes to the north point of the horizon, and the opposite meridian will cut the horizon in the south. Then, set the hour-index to the uppermost *XII* on its circle; which done, turn the globe westward until fifteen degrees of the equator pass under the brazen meridian, and then the hour-index will be at *I* (for the sun moves fifteen degrees every hour); and the first meridian will cut the horizon in the number of degrees from the north point that *I* is distant from *XII*. Turn on, until fifteen more degrees of the equator pass under the brazen meridian, and the hour-index will be then at *II*, and the first meridian will cut the horizon in the number of degrees that *II* is

distant from XII: and so, by making fifteen degrees of the equator pass under the brazen meridian for every hour, the first meridian of the globe will cut the horizon in the distances of all the hours from XII to VI, which is just ninety degrees; and then you need go no farther; for the distances of XI, X, IX, VIII, VII, and VI, in the forenoon, are the same from XII, as the distances of I, II, III, IV, V, and VI, in the afternoon: and these hour-lines continued through the centre, will give the opposite hour-lines on the other half of the dial; but no more of these lines need be drawn, than what answer to the sun's continuance above the horizon of your place on the longest day, which may be easily found.

Thus, to make an horizontal dial for the latitude of London, which is about $51\frac{1}{2}$ degrees north, elevate the north pole of the globe $51\frac{1}{2}$ degrees above the north point of the horizon, and then turn the globe, until the first meridian (which is that of London on the English terrestrial globe) cuts the north point of the horizon, and set the hour-index to XII at noon.

Then, turning the globe westward until the index points successively to I, II, III, IV, V, and VI, in the afternoon; or until 15, 30, 45, 60, 75, and 90 degrees of the equator pass under the brazen meridian, you will find that the first meridian of the globe cuts the horizon in the following numbers of degrees from the north towards the east, viz. $11\frac{2}{3}$, $24\frac{1}{4}$, $38\frac{1}{2}$, $53\frac{1}{2}$, $71\frac{1}{3}$, and 90; which are the respective distances of the above hours from XII upon the plane of the horizon.

To transfer these, and the rest of the hours, to a horizontal plane, draw the parallel right lines $a c$ and $b d$ (fig. 3) upon that plane, as far from each other as is equal to the intended thickness of the gnomon or stile of the dial, and the space included between them will be the meridian or twelve o'clock line on the dial. Cross this meridian at right angles with the six o'clock line $g h$, and setting one foot of your compasses in the intersection a , as a centre, describe the quadrant, $g e$, with any convenient radius or opening of the compasses; then setting one foot in the intersection b as a centre, with the same radius describe the quadrant $f h$, and divide each quadrant into ninety equal parts or degrees, as in the figure.

Because the hour-lines are less distant from each other about noon, than in any other part of the dial, it is best to have the centres of these quadrants at a little distance from the centre of the dial-plane, on the side opposite to XII, in order to enlarge the hour-distances thereabout under the same angles on the plane. Thus, the centre of the plane is at C , but the centres of the quadrants at a and b .

Lay a ruler over the point b ; and keeping it there for the centre of all the afternoon-hours in the quadrant $f h$, draw the hour-line of I, through $11\frac{2}{3}$ degrees in the quadrant; the hour-line of II, through $24\frac{1}{4}$ degrees; of III, through $38\frac{1}{2}$ degrees; IV through $53\frac{1}{4}$, and V through $71\frac{1}{3}$: and because the sun rises about four in the morning on the longest days at London, continue the hour-lines of IV and V, in the afternoon, through the centre b to the opposite side of the dial. This done,

lay the ruler to the centre *a* of the quadrant *eg*, and through the like divisions or degrees of that quadrant, viz. $11\frac{2}{3}$, $34\frac{1}{4}$, $38\frac{1}{2}$, $53\frac{1}{2}$, and $71\frac{1}{3}$ draw the forenoon hour-lines of XI, X, IX, VIII, and VII; and because the sun sets not before eight in the evening on the longest days, continue the hour-lines of VII and VIII in the forenoon, through the centre *a*, to VII and VIII in the afternoon; and all the hour-lines will be finished on this dial; to which the hours may be set, as in the figure.

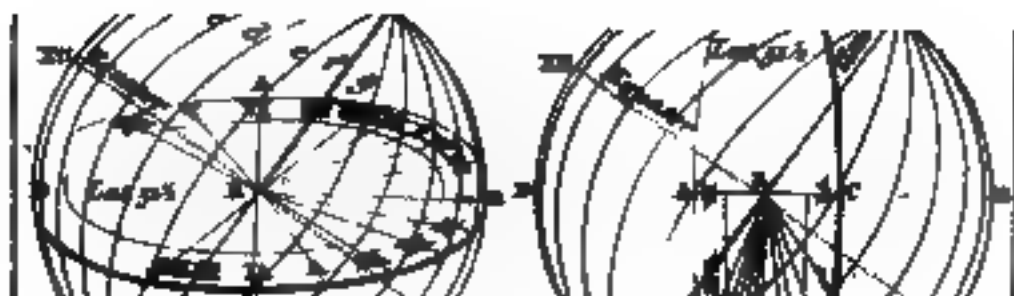
Lastly, through $51\frac{1}{2}$ degrees of either quadrant, and from its centre, draw the right line *ag* for the hypotenuse or axis of the gnomon *agi*; and from *g*, let fall the perpendicular *gi*, upon the meridian line *ai*, and there will be a triangle made, whose sides are *ag*, *gi*, and *ia*. If a plate similar to this triangle be made as thick as the distance between the lines *ac* and *bd*, and set upright between them, touching at *a* and *b*; its hypotenuse *ag* will be parallel to the axis of the world, when the dial is truly set, and will cast a shadow on the hour of the day.

The trouble of dividing the two quadrants may be saved, by means of a scale with a line of chords upon it: for if we extend the compasses from 0 to 60 degrees of the line of chords; and with that extent, as a radius, describe the two quadrants upon their respective centres, the above distances may be taken with the compasses upon the line, and set off upon the quadrants.

“To make an erect direct South Dial.”—Elevate the pole to the co-latitude of your place, and proceed in all respects as above taught for the horizontal dial, from VI in the morning to VII in the







afternoon ; only the hours must be reversed, as in figure 4, and the hypotenuse ag , of the gnomon agf , must make an angle with the dial-plane equal to the colatitude of the place. As the sun can shine no longer on this dial, than from six in the morning until six in the evening, there is no occasion for having any more than 12 hours upon it. See *Ferguson's Mechanics*.

DIAL, Equinoctial, is that described on an equinoctial plane, or a plane representing that of the equinoctial. Dials of this kind are usually distinguished into upper, which look towards the zenith, and lower, which respect the nadir. Now as the sun only illumines the upper surface of an equinoctial plane, while he is in our hemisphere, or on the northern side of the equator, an upper equinoctial dial will only shew the hour during the spring and summer season. And again, as the sun only illumines the lower surface of an equinoctial plane, while he is in the southern hemisphere, or on the other side of the equator, a lower equinoctial dial will only shew the hour in autumn and winter. To have an equinoctial dial therefore that shall serve all the year round, the upper and lower must be joined together ; that is, it must be drawn on each side of the plane.

DIAMETER, in geometry, a right line passing through the centre of a circle ; and terminated at each side by the circumference thereof: the chief properties of the diameter are that it divides the circumference of a circle into two equal parts ; hence a method of describing a semi-circle upon any line assuming its middle point for the centre. The diameter is the greatest of chords. See **CONIC SECTIONS**.

DIAMETER, in astronomy. The diameters of the sun and planets are either apparent or real: the apparent diameters are such as they appear to the eye, and being accurately measured by an instrument, are found different in different parts of their orbits. The apparent diameter of the sun is found to vary from 32' 38" in January when it is nearest to us; to 31' 33" in July when it is farthest from us. The apparent diameters of the moon varies from 29' 28" to 33' 36": her real diameter is about 2180 miles in length. The apparent diameters of the planets when at their respective mean distances from the earth are as follow:

Mercury	11"	Jupiter	39"
Venus	58"	Saturn	18"
Mars	27"	Herschel	3" 54"

From these apparent diameters and the respective distances from the earth, the real diameters of the sun and planets have been determined in English miles, which are given in the following numbers.

	Miles.		Miles.
Mercury	3224	Jupiter	89.170
Venus	7687	Saturn	79.042
Mars	4189	Herschel	35.112

The Sun 883.246.

DIAMOND, this is the most valuable and hardest of gems, and though found of different shapes, and sometimes accidentally tinged to several colours; yet it ever carries the same distinguishing characters, and is very evidently in all those states the same body. It is, when pure, perfectly clear and pellucid as the purest water, and is eminently distinguished from all other substances, by its vivid splendor, and the brightness of its reflections. It

is extremely various in shape and size, being found in the greatest quantity very small, and the larger ones extremely seldom met with; the largest diamond ever certainly known to have been found is that in the possession of the Great Mogul, which weighs 879 carats, and is computed to be worth £1,779,244.

The diamond has certainly one proper and determinate figure, into which it must naturally con-
crete, when in a state of rest, and impeded by no other accident in its formation: the true figure is an equilateral octahedron; and wherever it has con-
creted in a perfect manner, and without any in-
terrupting accidents, it has always formed itself into this figure; and often in this its several sur-
faces are as bright as if polished by art: but, as in
common salt, though its figure be pyramidal, yet
very trifling accidents can determine it into cubes
and parallelepipeds; so the diamond has often, in
the state of formation, been thrown into two other
figures, both also seeming regular ones; the one a
prismatic columnar one of six angles, somewhat
emulating the figure of crystal, the other an oblong
quadrilateral column with two truncated ends: these
seem the only regular figures of this gem; but be-
sides these it is every day found in numberless other
irregular shapen forms, often roundish, emulating the
shape of pebbles, but full of small flat planes or
faces; frequently oblong, very often flat, and as
often tapering, either from one end to the other, or
else from the middle to both ends. It is common
for diamonds to be too thick or deep for the extent
of their surface, and there is a certain proportion of
depth, beyond which the gem should not be al-

lowed : in this case two diamonds are often made, by the regularly dividing one : this, when the mass is of an angular figure, is done by cutting it through with a wire, wetted with oil, and covered with diamond-powder ; but in the flat or more common masses, it is done much more expeditiously by the grain of the stone, and introducing the point of a fine flat chissel between them. This is not the only use of the splitting, for when a diamond has a flaw, or blemish in it, which greatly debases its value, the plates may be separated at a proper breadth, and the flaw removed ; in which case the thinner crest, struck off, is of value in proportion to its size, and the remainder, being now freed from its flaw, is of much more value than it was at first. The places whence diamonds are brought are the island of Borneo, and the kingdoms of Visapour, Golconda, Bengal, in the East Indies ; and the Brasils in the West-Indies. They are not unfrequently found yellowish, bluish, and reddish, but more rarely greenish.

In the experiments of modern chemists, the diamond has been reduced to ashes by the power both of the furnace and the burning-glass. In the *Monthly Magazine* for September 1799, an account was given of some interesting experiments by Guyton, in Paris, on the combustion of the diamond ; whereby it was proved to be a substance similar to charcoal, but containing much more of the pure carbonic principle. This fact has been farther ascertained by the very singular experiment of substituting diamond instead of charcoal, in the conversion of a small portion of malleable iron into steel. For this purpose, a very small

crucible of the purest soft or malleable iron was made out of heads of nails, and fitted with a stopper of the same metal, closely fitting. Into this a small diamond was put, the remaining space around the diamond was filled up with filings of the same iron, and the stopper rammed in very close. The whole was then inclosed in an earthen crucible, this last in a larger of the same material; and the whole closely luted, and exposed for about an hour in a very strong forge furnace. When all was cold, the crucible of iron was found melted down into a button of cast steel. This, when broken, exhibited a perfectly smooth, uniform fracture, and not a vestige of the diamond remained. The steel was exactly similar to that known in England by the name of cast steel. The inference from this curious experiment is, that as diamond will perform the office of charcoal, in converting iron into steel, its nature is the same or very similar to that of charcoal.

DIANDRIA, in the Linnæan system of Botany, a class of plants comprehending all those with hermaphrodite flowers, and only two stamina in each; such are sage, olive, phillyrea, jessamin, rosemary, &c.

DIAPASON, in music, a musical interval, by which most authors, who have wrote upon the theory of music, use to express the octave of the Greeks. The diapason is the first and most perfect of the concords; if considered simply, it is but one, harmonical interval; though, if considered diatonically, by tones and semitones, it contains seven degrees, viz. the three greater tones, two lesser tones, and two greater semitones. The interval of a diapason,

that is, the proportion of its grave sounds to its acute, is duplicate, i. e. as 2 : 1.

DIAPASON, among the musical instrument makers, a kind of rule or scale, whereby they adjust the pipes of their organs, and cut the holes in their flutes, hautboys, &c. in due proportion, for performing the tones, semitones, and concords just.

DIAPHRAGM, in anatomy, a large muscular membrane or skin placed transversely in the trunk, and dividing the thorax from the abdomen.

DIARY, a table of days: See **ALMANACK**. The subjoined table, showing the days of the week that begin the several months for ever, is, to that effect, a *perpetual diary* :

Month.	A	B	C	D	E	F	G
JANUARY ...	Sun.	Sat.	Frid.	Thu.	Wed.	Tue.	Mon.
FEBRUARY	Wed.	Tue.	Mon.	Sun.	Sat.	Frid.	Thu.
MARCH	Wed.	Tue.	Mon.	Sun.	Sat.	Frid.	Thu.
APRIL	Sat.	Frid.	Thu.	Wed.	Tue.	Mon.	Sun.
MAY	Mon.	Sun.	Sat.	Frid.	Thu.	Wed.	Tue.
JUNE	Thu.	Wed.	Tue.	Mon.	Sun.	Sat.	Frid.
JULY	Sat.	Frid.	Thu.	Wed.	Tue.	Mon.	Sun.
AUGUST	Tue.	Mon.	Sun.	Sat.	Frid.	Thu.	Wed.
SEPTEMBER	Frid.	Thu.	Wed.	Tue.	Mon.	Sun.	Sat.
OCTOBER ...	Sun.	Sat.	Frid.	Thu.	Wed.	Tue.	Mon.
NOVEMBER	Wed.	Tue.	Mon.	Sun.	Sat.	Frid.	Thu.
DECEMBER	Frid.	Thu.	Wed.	Tue.	Mon.	Sun.	Sat.

This table is very plain ; for having the dominical letter for the given year, find that on the head, and guide your eye down from it till you come opposite the month, and there is the name of the day of the week that begins that month. See DOMINICAL Letter.

DIASTOLE, signifies the dilatation of the heart, auricles, and arteries, and stands opposed to the systole, or contraction of the same parts.

DIATESSARON, a concord or harmonical interval composed of a greater tone, a less tone, and one greater semitone : its proportion in numbers is 4 : 3. The word diatessaron has of late years been applied by authors for a harmony of the four gospels.

DICE, certain cubical pieces of bone or ivory marked with dots on each of the faces, from one to six, according to the number of faces. There are divers ways of making dice to suit the purposes of gamblers and villains : as by sticking a hog's bristle in them, so as to make them run high or low :—or by drilling and loading them with quicksilver, which cheat may be discovered by endeavouring to balance them by their diagonal corners, for if they are false, the heavy sides will, under such circumstances, always turn down. Dice are said to be of great antiquity, and to have been invented by Palamedes at the siege of Troy, for the amusement of the officers and soldiers. Dice like cards pay a very heavy duty to government, and cannot legally be imported.

DIKTATOR, in the policy of the ancient Romans, a magistrate invested with sovereign and even arbitrary power. He had the power of life and death ;

also to raise or disband troops, make war or peace, and that without the consent either of the senate or people, or being accountable for his proceedings. He was elected by one of the consuls in the night-time on the frontiers of the common-wealth, and no where else; and the ordinary duration of his office was only for six months, during which time all other magistracies ceased, the tribuneship excepted. Whenever he appeared in public, he was attended by twenty-four lictors, or double the number allowed a consul. However, notwithstanding all this power, he could not go out of Italy, or even ride on horse-back during a march, without leave from the people. This was accounted the safe-guard of the common wealth for four hundred years together, till Sylla and Cæsar, by assuming the title of perpetual dictators, converted it into tyranny, and rendered the very name odious.

DIDELPHIS or Opossum, in natural history, is noticed for the singularity of its structure, which consists in the female's possession of a bag or pouch in the lower part of the abdomen, which is opened and closed at pleasure, and to which her young resort for shelter and security in a variety of dangers. The Virginian opossum is gentle and inoffensive. The female produces four or five at a birth, and prepares a sort of nest for herself of grass, near the root of a tree. She has the power of closing her pouch so completely as to render it a matter of difficulty to open it. See Plate Nat. Hist. fig. 9. The great flying opossum of New-Holland is nearly two feet in length to the beginning of its tail, which is likewise about two

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AND
A
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PASSED
BY
THE
SENATE
ON
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S. R. 1080

[illegible]

Fig. 8. *Columba carolinensis* (Linn.)

Fig. 9. *Columba carolinensis*.

Fig. 10. *Didelphis volans* (Flying Opossum).

Published by J. H. R. & P. Co. 1862

feet long. By an expansile membrane reaching on each side of its body, from the fore to the hind legs, it is enabled to leap to an extraordinary distance, and has thus gained its name. Its fur is of the most exquisite fineness, and for the greatest part of a sable, or deep grey, brown colour, extremely brilliant.

DIDUS, or dodo, is a genus of birds of the order Gallinæ, containing three species, of which the *Didus ineptus* may be noticed, it is called the hooded dodo, is a very large bird, and does, or at least did, inhabit the islands of Bourbon and Mauritius. Its pace is very slow, and some individuals are said to weigh 150lbs. each. Its head appears to be covered with a black cowl, and altogether its figure is singularly curious and grotesque. See Plate Nat. Hist. fig. 10.

DIDYNAMIA, in the Linnæan system of botany, a very comprehensive class of plants, the fourteenth in order; the essential characteristic of which is, that there are four subulated stamina, inserted into the tube of the flower, two whereof are shorter than the others, and placed together; the antheræ being commonly hid under the upper lip of the flower, and connivent in pairs. To this genus belong baum, germander, lavender, thyme, betony, mint, basil, fox-glove, bear's-breech, &c.

DIER, or **DYER**, in matters of policy, is used for the general assembly of the states, or circles of the empire of Germany, and formerly of Poland, to deliberate and concert measures proper to be taken for the good of the public. The general diet of the empire was usually held at Ratisbon: it consists of the emperor, the nine electors, and the ecclesias-

tical princes, viz. the archbishop, bishops, abbots, and abbesses ; the secular princes, who are dukes, marquises, counts, viscounts, or barons ; and the representatives of the imperial cities. It meets on the emperor's summons, and any of the princes may send their deputies thither in their stead. The diet makes laws, raises taxes, determines differences between the several princes and states, and can relieve the subjects from the oppressions of their sovereigns.

The diet of Poland, or the assembly of the states, consisted of the senate and deputies, or representatives of every palatinate or country and city, and met usually every two years, and oftener, upon extraordinary occasions, if summoned by the king, or in his absence, by the archbishop of Gnesna. The general diet of Poland sat but six weeks, and often broke up in a tumult much sooner : for one dissenting voice prevented their passing any laws, or coming to any resolutions on what was proposed to them from the throne. Switzerland had also a general diet, usually held every year at Baden, and represented the whole Helvetic body : it seldom lasted longer than a month. Besides this general diet, there were diets of the Protestant cantons, and diets of the Catholic ones ; the first assembled at Araw, and were convoked by the canton of Zurich ; the second at Lucern, convoked by the canton of that name.

DIETETICS, the science or philosophy of diets ; or that which teaches us to adapt particular foods to particular organs of digestion, or to particular states of the same organ, so that the greatest possible portion of nutriment may be extracted from a given

quantity of nutritive matter; or a sufficient portion may be obtained with the least possible quantity of organic action and exhaustion. In this sense the science of dietetics embraces a knowledge as well of the organs and economy of digestion, as of the substances to be digested. The common experience of mankind will sufficiently acquaint any one with the sorts of food which are wholesome to the generality of men, and his own experience will teach him which of these agrees best with his particular constitution. Scarcely any other directions besides these are wanted; except the knowledge that as variety of food at the same meal, and poignant sauces, will tempt most persons to eat more than they can well digest, they ought, therefore, to be avoided by all of weakly habits of body, and by those who are desirous of preserving their health. See DIGESTION.

DIEU et mon droit, i. e. *God and my right*, the motto of the royal arms of England, first assumed by king Richard I. to intimate that he did not hold his empire in vassalage of any mortal. It was afterward taken up by Edward the Third, and was continued, without interruption, to the time of the late king William, who used the motto *je maintiendrai*, though the former was still retained upon the great seal. After him queen Anne used the motto *semper eadem*, which had been before used by queen Elizabeth; but ever since queen Anne, *Dieu et mon droit* has continued to be the royal motto.

DIGEST, in law literature, a collection of the decisions of the Roman lawyers properly digested, or arranged under distinct heads, by order of the em-

peror Justinian. It constitutes the first part or volume of the civil law.

DIGESTION: an important distinction exists between animals and vegetables, in the mode in which they receive their nourishment. Vegetables are perpetually absorbing matter from the soil, which immediately passes into the sap-vessels, and is soon changed by respiration and secretion. Animals, on the contrary, with few exceptions, take in food at intervals, and retain it in their stomach for a considerable time, where it undergoes a chemical change, which constitutes the function of digestion, the first step in the general process by which animal matter is formed. See **PHYSIOLOGY**.

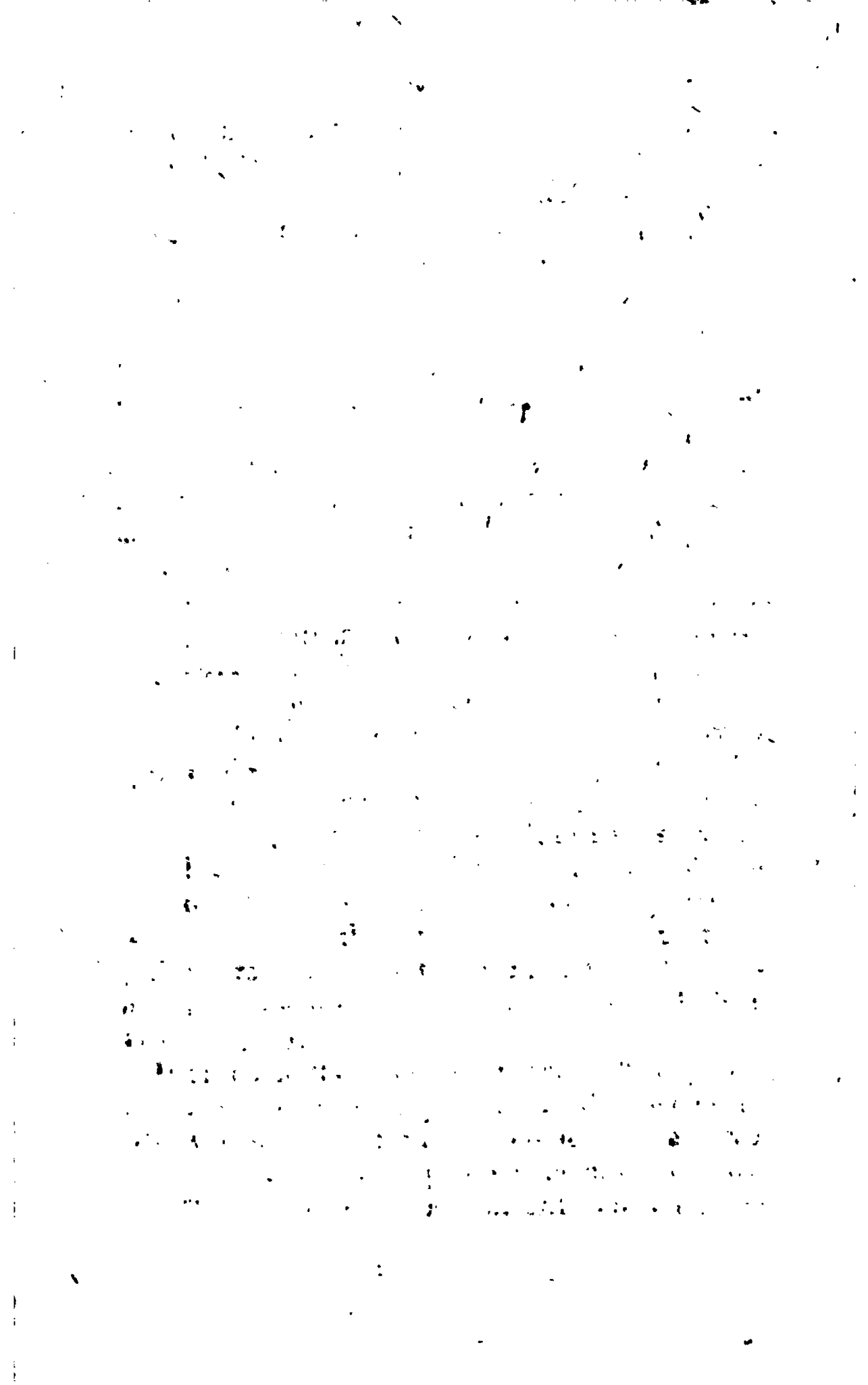
DIGIT, in astronomy, the twelfth part of the diameter of the sun or moon, is used to express the quantity and magnitude of an eclipse. Thus, an eclipse is said to be of six digits, when six of these parts are obscured. Digit is also a measure taken from the breadth of the finger: it is equal to three-fourths of an inch. Digits, in arithmetic, signify any integer under 10, as 1, 2, 3, 4, 5, 6, 7, 8, 9.

DIGYNIA, the name of an order, or secondary division in each of the first thirteen classes, except the ninth in Linnæus's system, consisting of plants, which to the classic character, add the circumstance of having two styles or female organs.

DILAPIDATION, is where an incumbent of a church living suffers the parsonage or out-houses to fall down, or to be in decay for want of necessary reparation; or it is the pulling down or destroying any of the houses or buildings belonging to a spiritual living, or destroying of the woods, trees, &c.

appertaining to the same; for it is to extend to committing or suffering any wilful waste in or upon the inheritance of the church.

Diocese, denotes a particular district, or division, under the direction and government of a bishop. It is the general opinion, that the Christian church in the modelling her own external polity, followed the state and division of the Roman empire, and that the ecclesiastical magistracy was originally formed upon the plan of the civil. As the empire therefore was divided into provinces and dioceses, (a diocese, according to Constantine's distribution, comprehended several provinces under the direction of a general magistrate) so the church set up her metropolitical and patriarchal power, the metropolitan bishops answering to the civil magistrates of provinces, and the patriarchs to the civil magistrates of dioceses. This is to be understood of the state of the church after the empire became Christian. Some pretend that a diocese, during the three first centuries, was never more than such a number of people as could meet, and ordinarily did meet, in a single congregation: others extend the limits of the ancient dioceses, so as to include a whole city, and the region about it. And this is the plain reason of that great difference we find in the extent of ancient dioceses, some being very large, others very small, according as each city happened to have a larger or lesser territory under its jurisdiction. Dioceses were originally called parishes, by which name is to be understood the episcopal city, with the country places and villages round it. The name diocese began first to be used in the fourth century, when the exterior po-



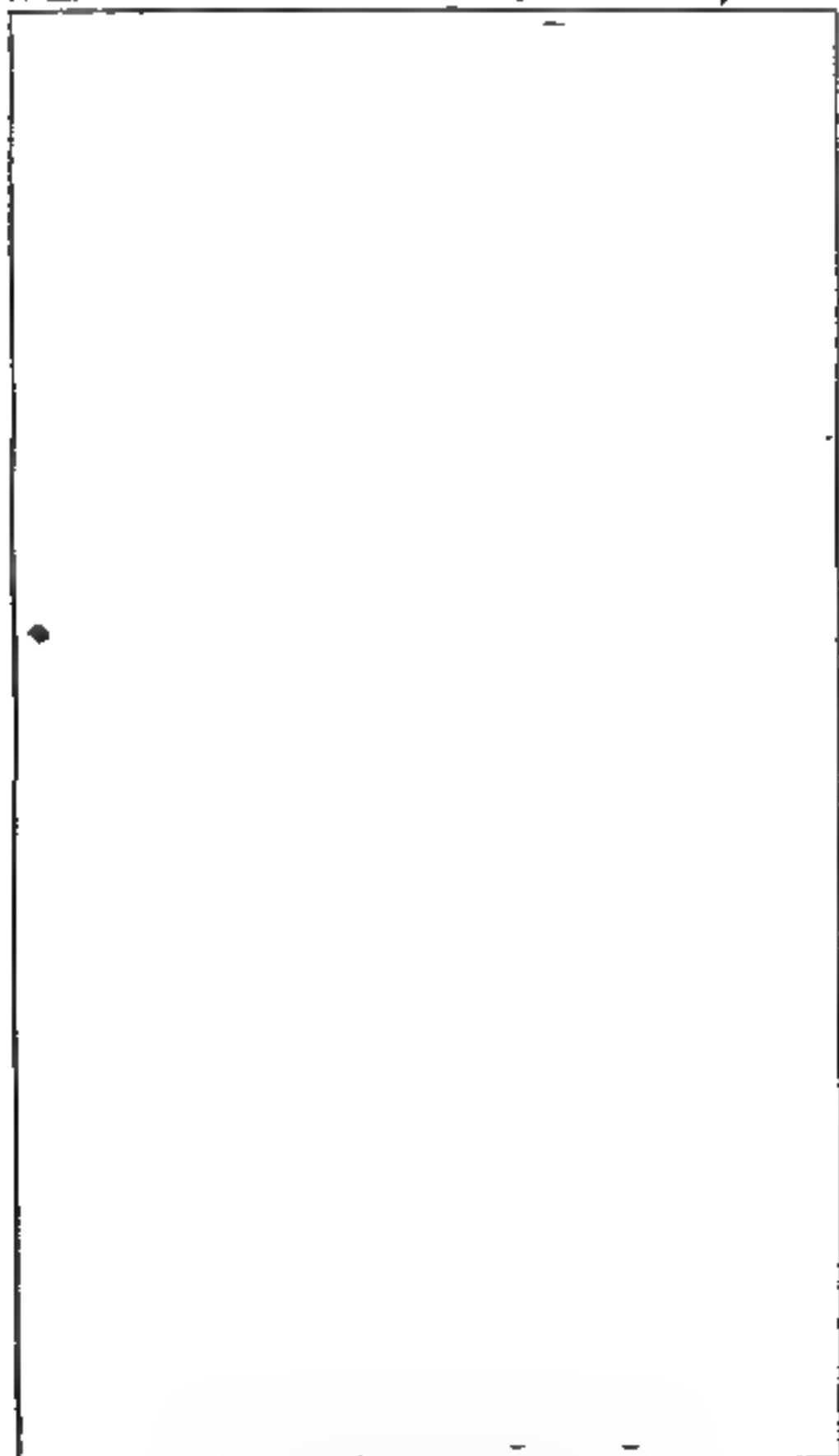


Fig. 10. *Didus inceptor*: Hooded Noddy.
Fig. 11. *Diodon hystrix*: Porcupine Noddy.
Fig. 12. *Diomedea exulans*: wandering Albatross.
Published by J. Harris & Sons, 1878.

Cooper's Engraving.

the male plants, so as to be within the reach of the farina foecundans.

DIOMEDIA, the albatross, in natural history, a genus of birds of the order anseres, of which there are many species. The *diomedia exulans*, or wandering albatross, is found in many parts of the world, but is very abundant at the Cape of Good Hope. Its length is sometimes four feet, and its extent, from wing to wing, ten. Its sounds are harsh, and thought to resemble the braying of an ass. Its arrival at Kamtschatka is regarded as an infallible presage of the speedy arrival of vast shoals of fish; upon these, however emaciated when it arrives, it fattens within a very short time. It quits Kamtschatka in August, and retires to Patagonia and the Falkland islands, where it builds its nest with earth, on the ground, a foot in height, and of a circular figure. While the female sits, the male is incessant in his assiduities to provide for her subsistence, and both are so tame as to permit any person to push them from their nest, and deprive them of their eggs, without the slightest resistance. See Pl. Nat. Hist. Fig. 12.

DIOPTRICS, the science of refractive vision, or that part of optics which considers the different refractions of light in passing through different media, as air, water, glass, &c. See OPTICS.

DIPLOMA, an instrument or licence given by colleges, societies, &c. to a clergyman to exercise the ministerial function, or to a physician to practise the profession, &c. after passing examination, or admitting him to a degree.

DIPLOMATIC letters. This is the art of reading letters written in cypher, and is founded on a know-

ledge of the art of writing according to this method of concealment. In examining a piece in newly invented characters we should endeavour to ascertain, whether the number of characters correspond, or nearly so, with the ordinary number of alphabetical letters. We must observe which of the characters, whether taken singly or combined, occur oftenest in the whole specimen ; and of these probably the most frequent will represent *e, a, i, o* ; *e* being much more common than the rest of the vowels, but *u* & *y* are even less frequent than many of the consonants. Endeavour next to ascertain the beginning and ending of words which are sometimes distinguished by spaces or points, or the insignificant marks interposed ; but however it be done, you must expect these signs to occur after every few letters, and the frequency of their occurrence may serve as some guide. When you have found out the distinction between words, take particular notice of the order, number, frequency, and combination of the letters in each word, and first examine the characters of which the shortest monosyllables are composed. Remember (1.) That no word can be without a vowel, a word of one letter must, therefore, be a vowel, or a consonant with an apostrophe : (2.) That the vowels are more frequently doubled at the beginning of words than the consonants : indeed the latter are only doubled at the beginning of Spanish and Welsh words : (3) That the vowels mostly exceed the consonants in short words ; and when the double consonants are preceded by a single letter, that this letter is a vowel. (4.) That the single consonant which precedes or follows double consonants is *l, m, n, or*

r ; (5) That the letter *q* is always followed by *u*, and when two different characters occur the latter of which is often joined with other letters, but the former never found alone, nor joined with any than the latter, those characters stand for *qu*, which two, excepting a few Scottish names are always followed by a vowel : 6. That although every language has something peculiar in its structure, the foregoing observations will apply with little variation to all the European languages.

In the English, *and*, and *the*, are more often found than any other words, *h* is frequently preceded by *w*, *c*, *s*, and *t* ; *y* is seldom used in the middle of a word ; the double letters *ll*, *ss*, appear frequently at the end of words ; *ed*, *ty*, *ly*, *ing*, and *tion*, are very common terminations ; *em*, *in*, *com*, and *con* are frequent prepositions : *a*, *i*, *o*, may stand alone : *o* is often followed with *u* ; *e* is much more frequent in the beginning of words than the middle ; and in the English the *e* is perpetually employed, as in *yes*, *yet*, *her*, *never*, *me*, *we*, *he*, *the*, *she*, *they*, *ye*, *fee*, *see*, *be*, *ever*, *speed*, *need*, *deference*, *excel*, *excess*, &c. When you meet with a character doubled in the middle of a word of four letters, it will be necessary to consider what words of four letters are so spelled. It is probable the vowels *o* or *e* are these ; as *meet*, *feel*, *good*, *book*, *look*, &c. In polysyllables, where a double character occurs in the middle of a word, it is for the most part a consonant, and if so, the preceding letter is always a vowel. See NICHOLSON'S BRITISH CYCLOPEDIA.

DIPLOMATICS, a word signifying the king's letters patent for the immediate expediting of an ambassador or envey to a foreign court. The principal

aim of the "corps diplomatic" is to discover the movements and intention of their brethren, and to conceal their own : to accomplish this, artifice, bribery, deceit, and prevarication, are more frequently necessary than open and manly conduct.

DIPPING, among miners, signifies the interruption, or breaking off of the veins of ore, an accident often attended with much trouble, before the ore can again be discovered.

DIPSACUS, in botany, contains four species, of which the *dipsacus fullonum*, or cultivated teasel, is reared in great quantities, in the West of England, for raising the nap upon woollen cloths, by means of crooked awns upon the heads. For this purpose they are fixed on the circumference of a large broad wheel, which turns round while the cloth is held against them.

DIPTERA, an order of insects in the Linnæan system, which contains such insects as are furnished with two wings only ; such as gnats, flies, and a variety of other insects. Under each wing is a clavate balancer or poiser with its appropriate scale.

DIPHTHONG, in grammar, a double vowel, or the mixture of two vowels pronounced together, so as to make one syllable. See the article *Vowel*. The Latins pronounced the two vowels in their diphthongs, *ae* or *æ*, *oe* or *œ*, much as we do, only that the one was heard much weaker than the other, though the division was made with all the delicacy imaginable. Diphthongs, with regard to the eyes, are distinguished from those with regard to the ears : in the former, either the particular sound of each voice is heard in the pronunciation, or the sound of one of them is drowned ; or, lastly, a new

sound, different from either, results from both : the first of these only are real diphthongs, as being such both to the eye and the ear. Diphthongs with regard to the ear are either formed of two vowels, meeting in the same syllable, or vowels whose sounds are severally heard ; or of three vowels in the same syllable, which only afford two sounds in the pronunciation. English diphthongs, with regard to the eye and ear, are *ai, au, ea, ee, oi, oo, ou*. Improper English diphthongs with regard to the eye only, are *aa, ea, ou, eu, ie, ei, oa, oe, ue, ui*.

DIPUS, the jerboa, a genus of Mammalia in natural history, containing four species. The *Dipus sagitta*, or Egyptian jerboa, is about the size of a rat, and was known to the ancients by the name of the two-footed mouse. It is found in various parts of Africa, and in the eastern provinces of Siberia. In its posture and motions it resembles a bird. It inhabits subterranean apartments, in which it reposes during the day, choosing the night for its excursions and for obtaining its food. In Egypt jerboas are used as food : are extremely fond of basking in the sun when tame, and are often very playful and alert.—See *Pl. Nat. Hist.* fig. 13.

DIRECTION, in mechanics, signifies the path or line of a body's motion, along which it endeavours to proceed according to the force impressed.

DIRECTOR, in commercial polity, a person who has the management of the affairs of a trading company : thus we say the Directors of the India-Company, South-Sea-Company, &c. See **COMPANY**. The directors are considerable proprietors in the stocks of their respective Companies, being chosen by plurality of votes from among the body

of proprietors. The Dutch East-India Company have sixty such directors ; that of France twenty-one ; the British East-India-Company has twenty-four, including the chair-man, who may be re-elected for four years successively. These last have salaries of 150*l.* a year each, and the chairman 200*l.* They meet at least once a week, and commonly oftener, being summoned as occasion requires. But besides these directors, who reside in Europe, and there superintend the general economy of the trading companies, there are also officers belonging to them in Asia, Africa, and America, under the title of director-general, and, by an honourable abbreviation, generals. The English gave these the title of Presidents, whereof there used to be two in the East-Indies, one at Surat, and the other at Bantam. They have the absolute disposal of all the Company's effects, regulate their trade, establish new compting-houses, and command all the merchants, and even captains of ships ; make presents to princes, treat with them, &c. It is true, they have a council, but one entirely subservient to their pleasure.

DIRECTOR, in surgery, a grooved probe to direct the edge of the knife or scissars in opening sinusses or fistulæ, &c. that by this means the subjacent nerve, and tendons may remain unhurt.

DISABILITY, an incapacity in a man to inherit or take a benefit which otherwise he might have done, which may happen by the act of any ancestor : by the act of the party himself : by the act of the law, and by the act of God.

Disc, discus, in antiquity, a quoit made of stone, iron, or copper, five or six fingers broad, and more

than a foot long, inclining to an oval figure, which was hurled in the manner of a bowl, to a vast distance, by the help of a leathern thong tied round the person's hand who threw it, and put through a hole in the middle. Homer has made Ajax and Ulysses great artists at this sport; and Ovid, when he brings in Apollo and Hyacinth playing at it, gives an elegant description of this exercise, lib. x. ver. 175.

Disc, in astronomy, the body and face of the sun and moon, such as it appears to us on the earth; or the body or face of the earth, such as it appears to a spectator in the moon, &c. The disc in eclipse is supposed to be divided into twelve equal parts, called digits: in a total eclipse of the luminaries, the whole disc is obscured; in a partial eclipse, only a part thereof. If we imagine a plane to pass through the centre of the earth, so that the line which joins the centres of the sun and earth, may be perpendicular to this plane, it will make on the surface of the earth a circle, which will separate the illuminated hemisphere of the earth from the dark. This circle, otherwise termed the circle of illumination, M. Keil calls the illuminated disc of the earth, which is directly seen by a spectator placed at the distance of the moon, in the right line which joins the centres of the sun and earth. All lines drawn from the centre of the sun to every single point of the disc are to be accounted parallel; and, therefore, since that line which is drawn to the centre of the disc is perpendicular to it, all the rest will be perpendicular to it, and therefore all lines drawn from the centre of the sun, and passing through every point of any circle upon the earth's surface,

when they are produced, will be perpendicular to the plane of the disc. Moreover, a spectator in the moon will see all countries, cities, and towns to move upon the disc, which motion is occasioned by the earth's rotation round its axis, and every point will have its way on the disc: the bigness of the earth's disc is to be estimated by the angle under which the earth is seen from the moon.

DISCIPLE, one who learns any thing from another: thus, the followers of any teacher, philosopher, &c. are called disciples. In the Christian sense they were followers of Jesus Christ, in general; but in a more restrained sense, the disciples denote those alone who were the immediate followers and attendants on his person, of which there were seventy or seventy-two. The names *disciple* and *apostle* are often synonymously used in the gospel-history, but sometimes the apostles are distinguished from disciples as persons selected out of the number of disciples, to be the principal ministers of his religion; of these there were only twelve. The Latins kept the festival of the seventy or seventy-two disciples on July 15, and the Greeks on January 4.

DISCORD, in music, the relation of the two sounds which are always and of themselves disagreeable, whether applied in succession or consenance. Thus the second, fourth, and seventh, with their octaves, and, in general, all intervals, except those few which precisely terminate the concords, are called discords. Discords are distinguished into concinnous and inconcinnous intervals.

DISCOUNT, a compensation for the advance of money which is not due till after a certain period,

which in this country is at the rate of 5 per cent. per annum. Thus if a person is entitled to 100*l.* at the end of a year, he usually pays 5*l.* to get the money at present. This is rather too much, because the sum that ought to be given is 4*l.* 15*s.* 2½*d.* only: for this improved will in a year amount to 5*l.* Upon this latter principle Smart's tables are calculated. In rough calculations one penny per pound, a month, is the discount on bills: thus a bill due 5 months hence of 50*l.* may be discounted for pence $50 \times 5 = 250$ pence = £ 1. 0*s.* 10*d.*

DISCOUNT, in commerce, a term among traders, merchants, and bankers. It is used by the two former on occasion of their buying commodities on the usual time of credit, with a condition that the seller shall allow the buyer a certain discount at the rate of so much *per cent. per annum*, for the time for which the credit is generally given, upon condition that the buyer pays ready money. Among bankers, it is an allowance for ready money upon a note or bill of exchange.

DISSENTERS, separatists from the services and worship of the church of England. At the revolution, a law was enacted, that the statutes of queen Elizabeth and king James I. concerning the discipline of the church, should not extend to the Protestant dissenters. Persons dissenting, however, are to subscribe the declaration of 30 Car. II. cap. 1. and take the oaths of fidelity, &c. Besides, they are not to hold their meetings till their place of worship is certified to the bishop, or to the justices of the quarter-sessions, and registered. Also, they are not to keep the doors of their meeting-houses locked during the time of divine-service.

And to secure to them the free exercise of their religion, whoever disturbs or molests them in the performance of divine worship, on conviction at the sessions, is to forfeit twenty pounds, by the statute of William and Mary. Unless dissenters conform and receive the sacrament, as administered by the church of England, they are excluded from holding any public places under the government. The dissenters, tolerated by law, may be reduced to four classes, *viz.* Presbyterians, Independents, Baptists, and Quakers; to which may be added another sect, which some years ago obtained a toleration in this country, namely, the *Unitas Fratrum*, or Moravians. The principles on which dissenters separate from the church of England, are the same with those on which she separates herself from the church of Rome; these are, the right of private judgment, liberty of conscience, and the perfection of Scripture as the Christian's only rule of faith and practice. They maintain that Christ, and he alone, is the head of the church, and that they bow to no authority in matters of religion, but that which proceeds from him. By ignorant people, dissenters are often treated with scorn, but by the liberal, and those who are capable of appreciating their merit and character, they have met with a better reception in all ages, since they thought it right to abandon their secular interests for the sake of preserving their integrity. Dr. Taylor, speaking of the Dissenters who were ejected from their livings by the licentious Charles II. in 1662, says "They were men prepared to lose all, and to suffer martyrdom itself, and who actually resigned their livings, rather than desert the cause of civil and re-

ligious liberty, which, together with serious religion, would, I am persuaded, have sunk to a very low ebb, had it not been for the noble stand which these worthies made against imposition upon conscience, prophaneness, and arbitrary power. They had the best education England could afford: most of them were excellent scholars, judicious divines, pious, faithful, and laborious ministers, undaunted and courageous in their Master's work, standing close to their people in the worst times, diligent in their studies, solid, affectionate, powerful, awakening preachers, aiming at the advancement of real vital religion in the hearts and lives of men, which flourished wherever they had influence."

DISTANCE, in astronomy. The real distances of the sun and planets are found from their parallaxes. See PARALLAX. With respect to the planets, as the distance of the earth from the sun has been found by transits of Venus to be 95 millions of miles; from this one distance and the periodic times of the planets, the respective real distances of the whole may be found by means of Kepler's law, "that the squares of the periodic times are as the cubes of their mean distances from the sun."

DISTANCE, *apparent*, in optics, is that distance which we judge an object is placed at, when seen afar off, being usually very different from the true distance; because we are apt to think that all very remote objects, whose parts cannot be well distinguished, and which have no other object in view near them, are at the same distance from us, though perhaps the one is millions of miles nearer than the other, as is the case with regard to the sun and moon.

DISTANCE of the eye, in perspective, is measured by a line drawn from the eye to the principal point; but the "point of distance" is a point in the horizontal line at such a distance from the principal point, as is that of the eye from the same.

DISTANCE, as applied to the turf, is a length of 240 yards from the winning post of a race-course: precisely at which spot is fixed a post corresponding with others, but having a gallery, capable of holding three or four persons, which is called the distance post. In this gallery as well as in that of the winning post, before the horses start each heat, a person is stationed holding a crimson flag; during the time the horses are running, each flag is suspended from the front of the gallery to which it belongs, and the flag is inclined forward as a horse passes either post. Now if there be any horse which has not come up to the distance post, before the first horse, in that heat, has reached the winning post, as is manifested by the motion of this flag, such horse is said to be "distanced," and is incapable of running any more during that race.

DISTILLATION, a chemical process, which consists in separating bodies which are volatile, from those that are more fixed, by the application of heat. All bodies which are capable of the vaporous form, at the same time that they are not decomposed, or otherwise changed in their properties, are capable of being separated from other matter by distillation. The process employed for distilling liquid bodies from other matter is simply called distillation, that on the contrary used to separate solid bodies, by giving them the elastic form, is

termed sublimation. The apparatus employed, for the first process are of several kinds, suited to the nature of the volatile body. That employed for the distillation of water, alcohol, essential oils, simple waters, &c. is called a still, and may be thus described. It consists of a copper boiler inserted within brick-work. The materials to be distilled being introduced into the boiler, the still head B is fixed on. The fire being kindled, and the contents of the still made to boil, the spirit, &c. will rise in the form of vapour into the head, and passing over into the worm which is fixed in a tub of cold water, it is condensed into the liquid form, and will flow through the cock E into any vessel placed there to receive it. See Plate Miscellanies, fig. 16. The apparatus employed for distilling bodies more easily condensable, consist of two parts, one called a retort, containing the substance to be distilled and the other the receiver, because it receives the substance raised from the retort. See **CHEMICAL Apparatus.** In the distillation of bodies which afford permanent gases, as well as condensable matters, in addition to the receiver a number of connected vessels are employed, constituting what from its inventor, is called Woulfe's apparatus, in which, what is not condensed, or absorbed in the first bottle, passes forward to the second, and so on to the third or fourth, till at length the absolutely incondensable part is received into a vessel called a gazometer. Before the invention of this apparatus, this kind of distillation was attended with much danger, the receiver being liable to burst, and the fumes being of the most pungent and suffocating nature. This inconvenience is completely

described by Woulfe's apparatus, which is thus described, fig. 47. A is a glass retort, adjusted to a round vessel B. To the opening of B is fitted a glass tube C, the other extremity of which is conveyed into the liquor, contained in the glass vessel D; with this are connected two or three, or more similar vessels, by means of glass tubes, and to the last orifice of the range of vessels, is adapted a bent glass tube E, which is conveyed under a receiver, placed upon the shelf of the pneumatic sifter. See CHEMICAL Apparatus.

Water is poured into the first of these vessels B; caustic potash into the next, or such other substances as are necessary for absorbing, as they pass along, the gasses, or any production foreign to the substance wanted to be obtained in purity.

To obtain muriatic acid with this apparatus, put eight parts of clean muriate of soda, (common salt) reduced to fine powder, into the retort A.

Add five parts of sulphuric acid, diluted with a little water. The vessel B will receive the impure sulphuric and muriatic acids, which pass over at the end of the operation. The series of bottles brought to contain a quantity of water, equal in weight to the salt employed. Heat being applied to the retort A, muriatic acid gas will be disengaged, which will mix with the water in the bottles, and form liquid muriatic acid. The tubes inserted in the middle of the bottles are called safety tubes, and are intended to allow some part of the gas to escape to prevent accidents. It is observable in distillation that one volatile substance will frequently carry along with it other bodies of considerable fixity. From the affinity which

water has to air, the evaporation of the former will take place at all temperatures below its boiling point, and though it has been thought that water might be freed from saline matter by distillation, it is found by experiment that several salts are carried over with the vapour of the water, which in their dry state would undergo decomposition before they would be induced to assume the elastic form. Hence water, by the common mode of distillation, cannot be rendered pure. From the circumstance, that the air is capable of raising water and other liquids at a low temperature, we are enabled to perform the distillation of such liquids by making a slight degree of difference of temperature, between the retort and the receiver. Water and alcohol may be obtained perfectly pure, by placing the retort in the temperature of 100° and the receiver in that of 50° Fahrenheit.

DISTRAINING, in law, the same with attaching, or distress.

DISTRESS, in law, the seizing or distraining any thing for rent in arrear, or other duty unperformed. The effect of this distress is to compel the party either to replevy the things distrained, and contest the act of trespass against the distrainer; or rather to oblige him to compound and pay the debt or duty, for which he was so distrained. There are likewise compulsory distresses in actions, to cause a person to appear in court; of which kind there is a distress personal of his moveable goods, and the profits of his lands, for contempt in not appearing after summons: there is likewise distress real of a person's immoveable goods. In these cases none shall be distrained to answer for any thing

touching their freeholds, but by the king's writ. Distress may be either finite or infinite: finite distress is that which is limited by law, in regard to the number of times it shall be made, in order to bring the party to a trial of the action. Infinite distress is that which is without any limitation, being made till the person appears: it is farther applied to jurors that do not appear as upon a certificate of assise, the process is *venire facias*, *habeas corpora*, and distress infinite. It is also divided into grand distress and ordinary distress: of these, the former extends to all the goods and chattels that the party has within the county. A person, of common right may distrain for rents and all manner of services: and where a rent is reserved on a gift in tail, lease for life, or years, &c. though there be no clause of distress in the grant or lease so as that he has the reversion: but on the feoffment made in fee, a distress may not be taken unless it be expressly reserved in the deed.

DIVAN, a council-chamber, or court in which justice is administered, in the eastern nations, particularly among the Turks. There are two sorts of divans, that of the grand seignior, called the council of state, which consists of seven of the principal officers of the empire; and that of the grand vizir, composed of six other vizirs or counsellors of state, the chancellor, and secretaries of state for the distribution of justice.

DIVIDEND, is the proportion of profits which the members of a society or public company, receive at stated periods according to the share they possess in the capital or common stock of the concern. The term is applied also to the annual interest paid by

government on various public debts, this however is by no means a division of profits. In this sense, the order by which stock-holders receive their interest is called a dividend warrant, and the portions of interest unreceived are denominated unclaimed dividends.

Dividing instruments, are contrivances invented for the purpose of making with accuracy the graduations upon astronomical and mathematical instruments.

Diving, the art of descending under water to considerable depths, and abiding there a competent time. The uses of diving are very important, particularly in the fishing for pearls, corals, sponges, &c. The most remarkable diver was Nicolo Pesce, who, according to the account given by Kircher, was able to spend five days together in the waves, without any other provisions than the fish which he caught and ate raw. He would swim from Sicily to Calabria, carrying letters from the king. At length he met his fate in exploring the depths of Charybdis, at the instance of the king; who, after he had once succeeded in fetching up a golden cup that had been thrown in, ordered him to repeat the experiment. There have been various engines contrived to render the business of diving safe and easy; the great point is to furnish the diver with fresh air, without which he must either make a short stay, or perish. Those who dive for sponges in the Mediterranean, carry down in their mouths sponges dipt in oil; but, considering the small quantity of air that can be contained in the pores of a sponge, and how much that little will be contracted by the pressure of the incumbent air,

such a supply cannot subsist a diver long, since a gallon of air is not fit for respiration above a minute.

DIVING-bell, a machine contrived for the safe conveyance of a diver to any reasonable depth, and whereby he may stay more or less time under water, as the bell is greater or less. Dr. Halley's was three feet wide at top, and five at bottom, and eight feet high, and contained about sixty-three cubic feet, or near eight hogsheads in its concavity. This was coated with lead, so heavy, that it would sink empty, and the weight was distributed about the bottom; so that it would go down in a perpendicular position, and no other. In the top was fixed a strong but clear glass, to let in the light from above; and likewise a cock to let out the hot air that had been breathed; and below, was fixed a circular seat for the divers to stand on to do their business. This machine was suspended from the mast of a ship by a sprit, which was sufficiently secured by stays to the mast-head, and was directed by braces to carry it over-board, clear of the side of the ship, and to bring it in again. To supply the bell with air under water, two barrels, of about sixty-three gallons each, were made, and cased with lead, so that they might sink empty, each having a hole in its lowest part to let in the water, as the air in them is condensed in their descent, and to let it out again when they were drawn up full from below; and to a hole in the top of the barrel was fixed a hose, or hollow pipe, well prepared with bees-wax and oil, which was long enough to fall below the hole at the bottom, being sunk with a weight appended, so that the air in the upper part of the barrels could not escape, unless

the lower end of these pipes were first lifted up. These air barrels were fitted with tackle proper to make them rise and fall alternately, like to buckets in a well. In their descent they were directed by lines fastened at the under edge of the bell to the man standing on the stage to receive them, who, by taking up the ends of the pipes above the surface of the water in the bell, gave occasion for the water in the barrels to force all the air in the upper parts into the bell, while it entered below, and filled the barrels; and as soon as one was discharged, by a signal given, it was drawn up, and the other descended to be ready for use. As the cold air rushed into the bell from below, it expelled the hot air through a cock at the top of the bell, which was then opened for that purpose. By this method, air is communicated so quick, and in such plenty, that the doctor tells us, he himself was one of the five who was at the bottom in nine or ten fathoms water, for above an hour and a half at a time, without any sort of ill consequence; and he might have continued there as long as he pleased, for any thing that appeared to the contrary. In going down it is necessary it should be very gentle at first, that the dense air may be inspired, to keep up, by its spring, a balance to the pressure of the air in the bell: upon each twelve feet descent, the bell is stopped, and the water that enters is driven out by letting in three or four barrels of fresh air. By the glass above, so much light was transmitted, when the sun shone, that he could see perfectly well to write and read, and by the return of the air-barrels, he could send up orders, written with an iron pen, on small pieces of lead, directing, that

they were to be moved from place to place: but in the dark weather, when the sea was rough and troubled, it would be as dark as night in the bell; but then the doctor perceived he could keep a candle burning in the bell as long as he pleased, it being found, by experiment, that one candle consumes much about the same quantity of confined air, as one man does, viz. about a gallon per minute. The only inconvenience the doctor complained of was, that upon first going down, they felt a small pain in their ears, as if the end of a quill were forcibly thrust into the hole of the ear. This may proceed from its being some time before the air can get from the mouth, through the small canal of the eustachian tube, which leads to the inner cavity of the ear, where, when it comes, it makes an equilibrium with the outward air, pressing on the tympanum, and thus the pain, for a short time, ceases: then descending lower, the pain of the ear returns, and is again abated; and so on, till the bottom is gained, where the air is of the same density continually. This bell was so improved by the doctor, that he could detach one of his divers to the distance of fifty or a hundred yards from it, by a contrivance of a cap, or head-piece, somewhat like an inverted hand-basket, with a glass in the fore-part, for him to see his way through. This cap was of lead, and made to fit quite close about his shoulders: in the top of it was fixed a flexible pipe, communicating with the bell, and by which he had air, when he wanted, by turning a stop-cock near his head-piece. There was also another cock at the end in the bell, to prevent any accident happening from the person without. This

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person was always well clothed with flannels, which were warmed upon him before he left the bell, and would not suffer the cold water to penetrate. His cap contained air enough to serve him a minute or two, then by raising himself above the bell, and turning the cock, he could replenish it with fresh air. This pipe he coiled round his arm, which served him as a clue to find his way to the bell. See Plate Miscellanies, Figs. 18 and 19.

DIVISIBILITY, that property by which the particles of matter in all bodies are capable of separation, or disunion from one another. As it is evident that body is extended, so it is no less evident that it is divisible, for since no two particles of matter can exist in the same place, it follows, that they are really distinct from each other, which is all that is meant by being divisible. In this sense the least conceivable particle must still be divisible, since it will consist of parts which will be really distinct. Thus far extension may be divided into an unlimited number of parts, but with respect to the limits of the divisibility we are still in the dark. We can, indeed, divide certain bodies into surprisingly fine and numerous particles, and the works of nature offer many fluids and solids of wonderful tenuity; but both our efforts, and those naturally small objects, advance a very short way towards infinity. Ignorant of the intimate nature of matter, we cannot assert whether it may be capable of infinite division, or whether it ultimately consists of particles of a certain size, and of perfect hardness. We shall add a few instances of the wonderful tenuity of certain bodies, which have been produced either by art, or discovered by means of the microscope.

among the works of nature. Mr. Boyle mentions that two grains and a half of silk was spun into a thread 300 yards long: and a lady spun from a pound of wool, a thread equal to 95 English miles in length.

The ductility of gold likewise furnishes a striking example of the great tenuity of matter, for a single grain of this metal has been actually divided into at least half a million of particles, each of which is perfectly apparent to the naked eye. The animal, vegetable and even mineral kingdom furnish numerous examples of the subtilty of matter. What for instance must be the tenuity of the odoriferous particles of musk, when we find that a piece of it will scent a whole room, in a short time, and yet will hardly lose any sensible part of its weight. The human eye, unassisted by glasses, can frequently perceive insects so small as to be barely discernible. Now it is obvious that the limbs, the vessels, and other parts of such animals, must infinitely exceed in fineness every endeavour of human art. But the microscope has discovered wonders that are vastly superior, and such indeed as were utterly unknown to our forefathers, before the invention of that instrument. Insects have been discovered so small as not to exceed the 10,000 part an inch in length: so that 1,000,000,000,000 of them might be contained in the space of one cubic inch: yet each little animal must consist of parts connected with each other: with vessels; with fluids, and with organs necessary for its motions, for its increase, and for its propagation. How inconceivably small must those organs be, and yet they are, unquestionably, composed of other parts

still smaller, and still farther removed from the perception of our senses.

DIURNAL, in astronomy, something relating to the day in opposition to nocturnal, which regards the night.

DIURNAL arch, the arch or number of degrees that the sun, moon, or stars describe between their rising and setting.

DIURNAL motion of a planet, is so many degrees and minutes as any planet moves in twenty-four hours. Hence the motion of the earth about its axis, is called its diurnal motion.

The diurnal phenomena of heavenly bodies, arise from the motion of the earth round its axis: for since the earth turns round its own axis from west to east, every spectator on its surface must necessarily be carried round in the same way; and consequently those parts of the heavens which lie toward the east, will by and by come into his sight, and those which are visible to him, will depart out of it toward the west. Hence it is that the spectator not being sensible of his own motion (the reason of which is, because all things about him move along with him), imagines the whole heavens to turn round the contrary way, viz. from east to west, every twenty-four hours, which is nearly the time in which the earth performs one revolution about its axis.

Dock, in maritime affairs, is a pit, great pond, or creek, by the side of an harbour, made convenient either for building or repairing of ships. It is of two sorts: 1. **Dry-dock**, where the water is kept out by great flood-gates, till the ship is built or repaired, when the gates are opened, and the water

let in to float and launch her. 2. Wet-dock, a place where the ship may be hauled into, out of the tide's way, and so dock herself, or sink herself a place to lie in.

DOCK-YARDS, in ship-building, are magazines of all sorts of naval stores. The principal ones in England are those of Chatham, Portsmouth, Plymouth, Woolwich, Deptford and Sheerness. In time of peace, ships of war are laid up in these docks; those of the first rates mostly at Chatham, where, and at other yards, they receive from time to time such repairs as are necessary. These yards are generally supplied from the northern crowns with hemp, pitch, tar, rosin, &c. but masts, particularly those of the larger size, are brought from New England.

DOCKET, or *Dogget*, in law, signifies a brief in writing. The rolls of judgment, when brought into the court of common-pleas, are entered on the docket of that term: and attorneys keep docket-books, wherein they enter judgments.

DOCTOR, a person who has passed all the degrees of a faculty, and is impowered to teach or practise the same: thus we say, doctor in divinity, doctor in physic, doctor of laws. The title of doctor seems to have been created in the twelfth century, instead of *master*, and established with the other scholastic degrees of bachelors and licentiates, by Peter Lombard and Gilbert Porreus, then the chief divines of the university of Paris. Gratian did the same thing, at the same time at the university of Bologna. Though the two names of *doctor* and *master* were used a long time together, yet many think that their functions were different, the masters teaching

the human sciences, and the doctors those sciences depending on revelation and faith. Spelman takes the title of doctor not to have commenced till after the publication of *Lombard's Sentences*, about the year 1140, and affirms that such as explained that work to their scholars were the first that had the appellation of doctors.—To pass doctor in divinity at Oxford, it is necessary the candidate have been four years bachelor of divinity. For doctor of laws, he must have been seven years in the university to commence bachelor of law, five years after which he may be admitted doctor of laws. Otherwise in three years after taking the degree of master of arts, he may take the degree of bachelor of laws, and in four years more that of doctor: which same method and time are likewise required to pass the degree of doctor in physic. At Cambridge, to take the degree of doctor in divinity, it is required that the candidate have been seven years bachelor of divinity: though in several colleges the bachelor's degree is dispensed with; and he may go out *per saltum*. To commence doctor in laws, the candidate must have been five years bachelor of laws, or seven years master of arts. To pass doctor in physic he must have been bachelor in physic five years, or seven years master of arts. It is remarkable, that by a statute of 37 Henry VIII, a doctor of civil law may exercise ecclesiastical jurisdiction, though a layman.

DODECAGON, a regular polygon of 12 equal sides and angles. If the side of a dodecagon be 1, its area will be equal to 11.2 nearly, and the areas of plane figures being as the squares of their sides, therefore 11.2 multiplied by the square of the side

of any dodecagon will give its area. "To inscribe a dodecagon in a given circle:" carry the radius six times round the circumference, which will divide it into six equal parts, or will make a hexagon; then bisect each of those parts, which will divide the whole into 12 parts, for the dodecagon.

DODECAEDRON, one of the Platonic, or five regular bodies, being contained under a surface composed of twelve equal and regular pentagons. See p. 260, vol. I.

Dog, an animal well known for its attachment to mankind. The facility with which it becomes the companion of the human race, and acquires almost any habits, evinces that this is the design of its creation, though it is by no means unqualified to subsist in a wild state. There, it is a beast of prey, of the wolf kind, clearing the earth of carrion, and living in friendship with the vulture.

Tamed and educated by man, the numerous good qualities of dogs have claimed and received the tribute of universal praise. Their sensibility is extreme: witness their susceptibility of the slightest rebuke, and restless anxiety to be restored to favour. A still greater proof, is the lively sense they take, the concern, in the one case, and the satisfaction in the other, in the pain or sorrow, the comfort or pleasure, of those with whom they are intimate. Corrected, they seldom resent blows with anger, and never with sullenness: they only desire to be forgiven.

A dog sees nothing in the world but his master, and, so long as the link is unbroken, imagines his existence to depend upon him. These are the true characteristics of affection: hence, he follows him

through all fortunes, forsaking him neither for fatigue, hunger, ill-usage, or neglect. He who has once used him well, he is never disposed to leave. In all this, there is something of self-interest, but this is not the whole :—his gratefulness is extreme. Not only feeling, but intelligence, also, belongs to the dog. If he supposes the property, or even person of his master to be in danger, he acts not only with promptitude and zeal, but with the most admirable propriety ; and on these occasions his understanding is so evident that, what is very remarkable, we almost seem to think it an incongruity in nature that he is without an articulate voice ; and this deficiency can never strike us but where an animal, as the common expression is, *does all but speak*.

Of these dispositions and qualifications we are in part convinced by the most ordinary experience ; but they have been illustrated in an unusual manner in instances of which we have authentic narratives, and which are never read without applause and sympathy. The careful tenderness with which the Newfoundland dog seizes the body of a drowning sailor (so as to do him the least possible injury with his teeth) ; and the sagacious and moderate manner in which the mastiff secures him who he suspects to be a thief, are constant habits that have been witnessed by thousands. The skill of several species in the chase, where they act as the purveyors of man ; their domestic habits ; their kindness to children ; in a word, their general congeniality with man himself, have, in all ages, recommended them to his use and care ; and if in this association the dog has fulfilled his part with constancy and

warmth, mankind has not been insensible to his virtues, and unabating attachment. By the rich he has been loaded with luxuries; by the poor he has been praised; and the virtuous beggar, when he has parted with the companion of his misery, has accompanied the hard sacrifice to his necessity with the sincerest tears.

The shepherd's dog, is considered by Buffon as the parent stock whence all the species of the canine race have sprung; and that naturalist corroborates his idea by observing that they appear originally disposed, independently of education or habit, to take care of herds.

Zoologists reckon twenty-three canine species, among which are included the wolf, the hyena, the jackal, and the fox. The varieties of dogs are almost without end. Of the *faithful dog*, alone, there are thirty-five varieties, and numerous sub-varieties. The mastiff, as peculiar to England, is called the *English dog*. See CANIS.

DOGE, the chief magistrate in the republics of Venice and Genoa. The dignity is elective in both places: at Venice it continues for life, at Genoa it is only for two years. His title is "his serenity:" he is chief of the council, and mouth of the republic, he being to answer for her. The Venetians do not go into mourning at his death, being only the phantom of majesty, as all the authority is vested in the republic; the doge only lends his name to the senate; the power is diffused through the whole body, though answers to foreign ambassadors, &c. are made in the name of the doge. The money is struck in his name, but does not bear his arms. All the magistrates rise and salute him when he comes

into the council : but he rises to none but foreign ambassadors. He must not stir out of Venice, without leave of the counsellors, &c.

DOMESDAY, or *doms-day-book*, a very antient record made in the time of William the conqueror, which now remains in the exchequer, and consists of two volumes, a greater and a less ; the greater contains a survey of all the lands in most of the counties in England, and the less comprehends some counties that were not then surveyed. The book of domes-day was begun by five justices, assigned for that purpose in each county, in the year 1081, and finished in 1086. It was of such authority, that the Conqueror himself submitted, in some cases wherein he was concerned, to be determined by it. Camden calls this book the *Tax-book of king William* ; and it was farther called *Magna rolla*. There is likewise a third book of domes-day, made by command of the Conqueror ; and also a fourth, being an abridgment of the other books.

DOMINICAL LETTER, in chronology, is that letter of the alphabet which points out in the calendar the Sundays throughout the year, thence also called *Sunday letter*. See *Kalendar*. The distribution of days into weeks is marked by the seven first letters of the alphabet, A, B, C, D, E, F, G, beginning, at the first of January, to place the letter A ; to the second of January B is joined ; to the third C ; and so on to the seventh, where G is figured : and then again beginning with A, which is placed at the eighth day, B will be on the ninth, C at the tenth, and so continually repeating the series of these seven letters, each day of the year has one of them.

in the calendar. By this means the last day of December has the letter A joined to it, for if the 365 days, which are in a year, be divided by seven, we shall have fifty-two weeks, and one day over. If there had been no day over, all the years would constantly have fallen on the same day of the week, and each day of the month would constantly have fallen on the same day of the week: but now, on account, that besides the fifty-two weeks in the year; there is one day more, it happens, that on whatever day of the week the year begins, it ends upon the same day, and the next year begins with the following day. The letters being ranked in this order, that letter which answers to the first Sunday of January, in a common year, will show all the Sundays throughout the year, and to whatever days in the rest of the months, that letter is put, these days are all Sundays. If the first day of January be on a Sunday, the next year will begin on Monday, and the Sunday will fall on the seventh day, to which is annexed the letter G, which therefore will be the Sunday letter for that year; the next year beginning on Tuesday, the first Sunday will fall on the sixth of January, to which is adjoined the letter F, which is the Sunday letter for that year; and in the same manner, for the next following, the dominical letter will be E; and so on. By this means the Sunday letters will go on in a retrograde order, viz. G, F, E, D, C, B, A. But because every fourth year consists of 366 days, the series of letters will be interrupted, and the order will not return till twenty-eight years, or four times seven; and hence arises the cycle of twenty-eight years. See CYCLE of the sun.

*284 Solar Cycle
2011-2038*

Thus, if in a leap year, the first of January be Sunday, and consequently the dominical letter A, the twenty-fourth day of February will fall on a Friday, and the twenty-fifth on a Saturday ; and since both these days are marked in the calendar with the letter F, the following day, which is Sunday, will be marked with G, which letter will mark out all the Sundays, and consequently be the dominical letter the remaining part of the year ; and hence it is that every leap year has two dominical letters, the first of which serves from the beginning of the year to the twenty-fourth or twenty-fifth day of February, and then the other takes place and serves for the rest of the year. The intercalary day is placed between the twenty-third and twenty-fourth day of February, and so makes two twenty-fourths of February, which in the calendar are esteemed one and the same day, and have the same letter affixed to them ; but by our way of reckoning, they are called the twenty-fourth and twenty-fifth days of February. The dominical letter may be found by the following rule, for any year of any century :

“ Divide the centuries by four, and twice what does remain,

Take from six ; and then add to the number you gain,
Their odd years and their fourth, which dividing by seven,

What is left take from seven, the letter is given.”

Thus for the year 1811 the dominical letter is F, for the centuries, 18, divided by 4, leave 2, the double of which taken from 6 leaves 2 again, to which add 11, the odd years, and their fourth part 2, the sum 15 divided by 7 leaves 1, which taken

from 7 leaves 6, answering to F, the sixth letter in the alphabet.

DOMINICANS, an order of religious, called in France, jacobins, and in England, black friars, or preaching friars. This order, founded by St. Dominic, a native of Spain, was approved by Innocent III. in 1215, and confirmed by a bull of Honorius III. in 1216. The design of their institution was, to preach the gospel, convert heretics, defend the faith, and propagate Christianity. They embraced the rule of St. Augustine, to which they added statutes and constitutions, which had formerly been observed either by the Carthusians or Præmonstratenses. The principal articles enjoined perpetual silence, abstinence from flesh at all times, wearing of woollen, rigorous poverty, and several other austerities. This order has spread into all the parts of the world. It has produced a great number of martyrs, confessors, bishops; and they reckon three popes, sixty cardinals, 150 archbishops, and 800 bishops, of their order, besides the masters of the sacred palace, who have always been dominicans. They are inquisitors in many places. The nuns or sisters of this order, owe their foundation to St. Dominic himself, who built a monastery at Prouilles, where poor maids might be brought up and supplied with all necessaries for their subsistence. The habit of these religious was a white robe, a tawny mantle, and a black veil. Their founder obliged them to work at certain hours of the day, and particularly to spin yarn and flax to make their own linen. The nuns of this order have 130 houses in Italy, forty-five in France, fifty in Spain, fifteen in Portugal, forty in Germany, and

many in Poland, Russia, and other countries. They lie on straw beds; and never eat flesh excepting in sickness; but many monasteries have mitigated this austerity.

DORMANT, in heraklry, is used for the posture of a lion, or any other beast lying along in a sleeping attitude, with the head on the fore paws, by which it is distinguished from the couchant, where, though the beast be lying, yet he holds up his head.

DOVE-tailing, in carpentry, is the manner of fastening boards together by letting one piece into another, in the form of the tail of a dove. The dove-tail is the strongest of the jointings, because the tenon, or piece of wood which is put into the other, goes widening to the extreme, so that it cannot be drawn out again by reason of the extreme being larger than the hole.

Down, the shortest, smoothest, softest, and most delicate feathers of birds, particularly of geese, ducks, and swans, growing on their neck and part of the stomach. Down is a commodity of most countries, but that from the north of Europe is in the most repute. There is also the ostrich's down, otherwise ostrich's hair, used in the manufacture of hats, and coarse white cloth.

DOWN DERRY DOWN, or *derry down*, a famous burden of more than one English ballad, is justly observed by a writer in the *Monthly Magazine*, Vol. V. to have no meaning in that language. He suggests, at the same time, its Welsh original; and offers the following elucidations:

Y deri down (pronounced, Hey derry down);

To the oaks we will come.

Down's deri; and *Down y deri*;

We will come to the oaks :

Down, down, i'r deri down ;

We will come, we will come, to the oaks we will
come :

Down y deri, down ;

We will come to the oaks, we will come.

The same author observes that, from an examination of the economy of the ancient Britons, it would appear that a considerable part of their wealth consisted in numerous herds of swine, which were fed upon acorns in the woods.—The proverb is common—

Lawn meiziad wrh nzenaid gwynt ;

The swineherd is glad at the sighing of the wind :
i. e. He is glad, because the acorns are blown down.

DRACO VOLANS, a flying dragon in meteorology, a fiery exhalation, frequent in marshy and cold countries. It is most common in summer, and though principally seen playing near the banks of rivers, or in boggy places, yet sometimes mounts up to a considerable height in the air, to the no small terror of the amazed beholders ; its appearance being that of an oblong, sometimes roundish, fiery body, with a long tail. It is entirely harmless, frequently sticking to the hands and cloaths of people without injuring them in the least. There is, likewise, a "draco volans," an insect, found in Africa and India, and distinguished from the lizard tribe, merely by having a broad, lateral membrane, strengthened by radii or bony processes : it wanders about trees, and is able, by means of the membrane, to spring from bough to bough, and support itself for a few moments in the air ; it feeds on insects. It is in every respect a harmless and inoffensive animal, and in its very limited power of

flyi^{ng} resembles the flyi^{ng} squirrel or the bat. This representation of the flyi^{ng} dragon is totally different from what must be expected by those who are unacquainted with natural history, and whose ideas of the dragon are formed on the creations of poetry and romance. Though little adapted to excite terror, the flyi^{ng} dragon is well calculated to gratify curiosity. See Pl. Nat. Hist. Fig. 14.

DRAGOMAN, *Drogman*, or *Druggerman*, a name given in the Levant to the interpreters kept by the ambassadors of Christian nations, residing at the Porte, to assist them in treating of public affairs.

DRAGON'S-BLOOD, in pharmacy, a moderately heavy resin, of which there are two kinds: the one firm and compact, brought in lumps, of an inch long or more, and about half an inch in diameter; these are wrapped up in certain long and narrow leaves, and are called the drops, or tears, of dragon's blood. The other is brought in larger masses or cakes, of an irregular figure. The genuine dragon's blood is the fruit of a salt tree of the palm-kind, common in the island of Java, and some other parts of the East Indies.

DRAGOON, in military affairs, a musqueteer, mounted on horseback, who sometimes fights or marches on foot, as occasion requires. Dragoons are divided into brigades, as the cavalry, and each regiment into troops; each troop having a captain, lieutenant, cornet, quarter master, two serjeants, three corporals, and two drums. Some regiments have hautboys: they are very useful on any expedition that requires dispatch, for they can keep pace with the cavalry, and do the duty of infantry: they encamp generally on the wings of the army;

or at the passes leading to the camp; and sometimes they are brought to cover the general's quarters: they do duty on the generals of horse and dragoons, and march in the front and rear of the army.

DRAMA, a poem, or theatrical representation of some certain action, and representing a true picture of human life, for the delight and improvement of mankind. The principal species of the drama are two, comedy and tragedy. "It is impossible to ascertain," says an anonymous writer, "the exact period when theatrical amusements were first introduced into England; they are mentioned as having existed very early by William Fitz-Stephen, a monk of Canterbury, in his *Descriptio nobilissimæ civitatis Lundonæ*, written soon after the year 1170. "*Landonia pro spectaculis theatralibus, pro ludis scenicis, ludos habet sanctiores, representationes miraculorum quæ sancti confessores operati sunt, seu representationes passionum, quibus claruit constantia martyrum.*"—London, instead of common interludes belonging to the theatre, has plays of a more holy subject: representations of those miracles which the holy confessors wrought, or of the sufferings wherein the glorious constancy of the martyrs did appear. These representations being mentioned as neither new nor uncommon, we may reasonably conclude them to be of a date still more ancient; and they continued a long time after to be the only subjects for the drama; in which Pater Cœlestis, or The Heavenly Father, Our Blessed Saviour, The Virgin Mary, The Twelve Apostles, &c. were the leading characters. In the year 1878 the scho-

lars of Paul's School presented a petition to king Richard II. praying him to prohibit some inexperienced people from presenting the History of the Old Testament, to the great prejudice of the said clergy, who had been at great expence in order to represent it at Christmas. On the 18th of July, 1390, the parish clerks of London (by which expression we are to understand, *The Clergy*) played interludes at the Skinner's Well, near Clerkenwell; which continued three days: king Richard II. his queen, and nobles being present. And in the year 1409 they performed a play at the Skinner's Well, the subject being The Creation of the World; which lasted eight days: having the chief nobles and gentry of England for their audience. These *Mysteries*, as they were denominated, were followed by a species of the drama, stiled *Moralities*, in which the senses, passions, affections, virtues, and vices, were personified, and constituted the characters: these being of a moral turn, and contrived to entertain as well as instruct, soon exhibited some dawnings of poetry, with occasional attempts at wit and humour, which naturally introduced *comedy*: the earliest English piece, meriting that title, is *Gammer Gammon's Needle*, written by Dr. Still; performed at Christ's college, Cambridge, and printed in 1551. *Tragedy* soon after appeared with becoming dignity in *Ferrex* and *Perrex*, otherwise *Gorboduc*; written by Thomas Sackville and Thomas Norton; the former, who was afterwards lord Buckhurst, &c, was also author of the admirable Induction to the Complaint of Henry Duke of Buckingham, in *The Mirror for Magistrates*. This noble and pathetic tragedy was acted before

queen Elizabeth, Jan. 18, 1561; was spuriously printed in 1565, and afterwards, under the author's inspection, in 1570 or 1571. At this period a fool was almost indispensable on the stage, not only in comedies but also in the deepest tragedies; of which character no dramatic writer has availed himself more successfully than Shakspeare: his *Touchstone* in *As you like It*, and *Fool* in *King Lear* being, among many others which he produced, remarkable instances. In the infancy of the stage the players were priests; afterwards retainers to noblemen, under the sanction of whose name they performed; at length they were embodied and incorporated under royal authority: and, in the end, restricted and protected by acts of parliament, framed for the preservation of order and decorum in themselves; and their safety and encouragement in the exhibitions of the scenic art. When the *Mysteries* were the only dramatic performances, the stage, as is still the custom at Pekin, consisted of three distinct platforms, raised one above another; on the uppermost sat the *Pater Caelstis*, surrounded with his angels; on the second appeared the glorified saints; and the lowest was occupied by mere men, who had not yet quitted "the smoke and stir of this dim spot." On one side of this lowest platform was the resemblance of a dark and pitchy cavern, whence issued an appearance of fire and flames; and, when necessary, the audience were stunned by hideous yellings, imitative of the howlings of wretched souls, tormented by relentless demons, who frequently ascended through the mouth of the cavern to delight the spectators with their buffoneries,

and to instruct them, by their remorseless cruelty to the condemned, carefully to shun the commission of such crimes, as might plunge themselves into a similar predicament. In an improved state of the theatre, when regular plays were introduced, the cavern, with its concomitant, though heterogeneous, mixture of horror and mummery, was abolished; the uppermost platform, and its celestial *personæ*, also disappeared; two platforms only remaining, which continued in use a considerable time; the upper one serving for galleries, ramparts, or any other elevated situation, from which some of the actors might discourse with others, standing on the lower one now called *the stage*.

The characters from the earliest times to that of the restoration were personated by men or boys; at which period Mrs. Hughes was the first female who appeared in a regular drama, in the character of Desdemona: unless, as Mr. Malone with great appearance of probability conjectures, Mrs. Sanderson (afterwards Mrs. Betterton) may claim priority. The stage decorations and ornaments (if they may be so called) were formerly very homely; a piece of old tapestry serving for the scene; which you was to imagine, as the story of the drama required, represented a street, a grove, a castle, or the ocean: the stage was strewn with rushes, and the dresses made of buckram and baize, laced with lacquered leather: but what better could be expected for the prices taken? for at so low a rate as *two-pence* were some of the seats in our ancient theatres; there were others at *6d.* *1s.* and (the highest) *2s. 6d.* Some of the audience sat on stools upon the stage; drank wine and beer,

cracked nuts, and smoked tobacco during the performance. The *Mysteries* were frequently represented in churches, and on the sabbath; which practice it is thought was continued even after profane subjects had been introduced: the playing in churches was restrained by bishop Bonnor, in 1542, but the acting of plays on the sabbath-day continued till the reign of Charles I. at which period the players generally began to act at three o'clock in the afternoon, that the whole might be performed by day-light. The *Mysteries* seem in later times to have furnished the ground-work for another noted stage-performance, entitled *a puppet-show*; as appears from the following bill, printed in the reign of queen Anne; taken from the collection of title pages in the Harleian library, marked 5931:

“ By her majesty's permission, at Heatly's booth, over against the *Cross Daggers*, next to Mr. Miller's booth, during the time of *Bartholomew-fair*, will be presented a little opera, called *The old Creacion of the World* new revived, with the addition of the glorious battle obtained over the *French* and *Spaniards* by his Grace the Duke of *Marlborough*. The contents are these, 1. The creation of *Adam*, and *Eve*. 2 The intrigues of *Lucifer* in the garden of *Eden*. 3. *Adam* and *Eve* driven out of *Paradise*. 4. *Cain* going to plow; *Abel* driving sheep. 5. *Cain* killeth his brother *Abel*. 6. *Abraham* offereth up his son *Isaac*. 7. Three wise men of the *East*, guided by a star, come and worship *Christ*. 8. *Joseph* and *Mary* flee away by night, upon an ass. 9. King *Herod's* cruelty; his men's spears laden with children. 10. Rich *Dives* in-

vites his *friends*, and orders his *porter* to keep the beggars from his gate. 11. Poor *Lazarus* comes a begging at rich *Dives* gate, the dogs lick his sores. 12. The good Angel and Death contend for *Lazarus's* life. 13. Rich *Dives* is taken sick and dieth ; he is buried in great solemnity. 14. Rich *Dives* in Hell, and *Lazarus* in Abraham's bosom, seen in a most glorious object, all in machines descending in a throne, guarded with multitudes of angels ; with the breaking of the clouds discovering the palace of the sun, in double and treble prospects, to the admiration of all the spectators."

DRANK, among farmers, a term used to denote wild oats, which never fail to infest worn-out lands ; so that when plowed lands run to these weeds and thistles, the farmer knows it is high time to fallow them, or else to sow them with hay-seed, and make pasture of them. Some, indeed, destroy the drank, by sowing the lands with beans, and letting loose sheep upon them when young. This must be done in dry weather, and the sheep eat up the drank and other weeds, without touching the beans.

DRAPERY, in sculpture and painting, the representation of the clothing of human figures, and also hangings, tapestry, curtains, and most other things that are not flesh or landscape.

DRAUGHT, in trade, called also cloff or clough, is a small allowance on goods that are sold by weight, made by the king to the importer, or by the seller to the buyer, that the weight may hold out when the goods are weighed out by retail.

DRAUGHT is a term used in medicine for certain mixtures very useful in life : these are chiefly *emetic draughts* consisting of ipecacuanha in powder

mixed with water; 15 or 20 grains are sufficient for adults:—*Laxative* draughts are made of many articles; Epsom Salts prove as useful as most things, and may be used from 3 or 4 to 8 or 9 drams in moderately warm water. *Saline* draughts: take of salt of tartar one scruple, lemon juice half an ounce, or one scruple of the concrete juice, water an ounce, antimonial wine 10 or 12 drops. Pour the lemon juice upon the salt, and when the effervescence has ceased add the rest. It may be sweetened with sugar or simple syrup. A draught to promote *perspiration* may be thus prepared: Take of Minde-*rerus'* spirit, or liquor of acetated ammonia, half an ounce, spearmint water one ounce, antimonial wine 10 or 12 drops, mix them together, and let the whole be taken at bed-time.

DRAW-BACK, in commerce, certain duties, either of the customs or of the excise, allowed upon the exportation of some of our own manufactures; or upon certain foreign merchandize, that have paid duty on importation. Drawbacks are paid by the collector of the customs at the port where the goods are exported, on producing a debenture authenticated by the proper officers as the voucher for the payment. Drawbacks prevent the natural tendency of capitals from being deranged by taxation. When the duties paid on the importation of sugar, tobacco, &c. are returned on their exportation, the trade in those articles is only replaced on the situation it would have been in, if the articles had not been taxed. A still more equitable arrangement than that of draw-backs, is to allow the merchant, who imports any commodity which he may probably wish to export again, to deposit it in the King's

warehouses, giving bond for the payment of duties, should be disposed of it for home consumption. This is called "bonding," and is allowed to some extent.

DRAWING, the art of representing the appearances of objects upon a flat surface, by means of an outline which describes their form, and shadow, which shews them round, prominent, near, distant, &c. The learner cannot be too strongly recommended to encounter the difficulty of using only a free stile; for, though the pencil may thus seem much less manageable, than if handled in a cramped manner, this obstacle is as quickly overcome as any other, and the consequent advantages great and lasting. In acquiring the command of the pencil, and a knowledge of the forms of bodies, large and distinct examples should be copied. In shadowing with India-ink, &c. large hair pencils should be used, which, if good, have as fine a point as any other, and water should never be spared. What we have drawn large, we can draw small; but what we have drawn only small, we shall find ourselves very much at a loss to describe on a larger scale. We should copy both nature and good imitations of it, and improve ourselves by both: for though drawing is as it were a universal faculty, and nature a universal model, yet it avails us much to know how others have imitated it. We are free to improve upon former methods, but it is well that we should know them; it is necessary, meanwhile, that we should be acquainted with nature ourselves, that we may discover their imperfections or be truly sensible of their merits. Besides the knowledge of simple outline, the more scientific power

of delineating that which, independently of shadow is necessary to describe projection, must be attained. This, which is always dependent on the principles of "perspective," is, in representations of animals and many other objects, called "foreshortening." See PERSPECTIVE.

DREAMS have been described as the imaginations, fancies, or reveries of a sleeping man, and they are said to be deducible from the three following causes : 1. The impressions and ideas lately received, and particularly those of the preceding day. 2. The state of the body, particularly the stomach and brain ; and, 3. Association. That dreams are, in part, deducible from the impressions and ideas of the preceding day, appears from the frequent recurrence of these, especially of the visible ones in our dreams ; in general, ideas that have not affected the mind for some days, recur in dreams only from the second and third causes. That the state of the body affects our dreams is evident from the dreams of the sick and of those who labour under indigestions, spasms and flatulencies : and a little observation will shew that we are carried on from one thing to another in our dreams partly by association. In proof of what we have advanced we may observe, 1st. That the scenes which present themselves in dreams are taken to be real ; and we suppose ourselves present and actually hearing and seeing what passes, which is occasioned, by there being no other reality to oppose to the ideas which offer themselves, whereas in the common fictions of the fancy, while we are awake, there is always a set of real external objects, striking some of our senses and precluding a little mis-

take there. Again, the trains of visible ideas which occur in dreams are far more vivid than common visible ideas, and may therefore be more easily taken for actual impressions. 2ndly, There is a great wildness in our dreams ; for the brain during sleep is in a state so different from that in which the usual associations were formed, that they can by no means take place during vigilance. 3rdly. We do not take notice of, or are offended at any inconsistencies, but pass on from one to another. For the associations which should lead us thus to take notice and be offended, are, as it were, asleep ; the bodily causes also hurrying us on to other and new trains successively. But if the bodily state be such as favours ideas of anxiety and perplexity, then the inconsistency and apparent impossibility occurring in dreams are apt to give great disturbance and uneasiness. 4thly. It is common in dreams for persons to appear to themselves to be transferred from one place to another, by a kind of sailing or flying motion. This arises from the change of the apparent magnitude and position of the images excited in the brain ; this change being such as a change of distance and position in ourselves would have occasioned. 5thly. The dreams which are presented in the first part of the night are for the most part much more confused, irregular and difficult to be remembered than those which we dream towards the morning, and these last are often rational to a considerable degree, and regulated according to the usual course of our associations : For the brain begins then to approach to the state of vigilance and that in which the usual associations

were formed and cemented. However association has some power in wild and inconsistent dreams.

DREDGER, the term used in the admiralty-court for an oyster-fisher.

DRIFT of the forest, is an exact view and examination taken at certain times to know what beasts are there ; in order that none may come on the forest but such as have right ; and that the forest be not overcharged with beasts.

DRIFT, in mining, a passage cut out under the earth, betwixt shaft and shaft, or turn and turn ; or a passage or way, wrought under the earth, to the end of a meer of ground, or part of a meer.

DRIFT SAIL, a sail used under water, veered out right a-head by sheets, as other sails are. It serves to keep the ship's head right upon the sea in a storm, and to hinder her driving too fast in a current.

DRILL, in mechanics, a small instrument for making such holes as punches will not conveniently serve for. Drills are of various sizes, and are chiefly used by smiths and turners.

DRILL, or **DRILL-BOX**, a name given to an instrument for sowing land in the new method of horse-hoeing husbandry. It plants the corn in rows, makes the channels, sows the seeds in them, and covers them with earth when sown ; and all this at the same time, and with great expedition. The principal parts are the seed-box, the hopper, the plough and its harrow, of all which the seed-box is the chief. It measures, or rather numbers, out the seeds which it receives from the hopper, and is for this purpose as an artificial hand ; but it deli-

vers out the seed much more equally than can be done by a natural hand. See PLOUGH. Whoever is desirous of knowing more intimately the whole apparatus for this method of sowing, may see it fully described, and illustrated with figures, by Tull, in his *Horse-hoeing husbandry*.

DRINK, a part of our ordinary food in a liquid form, serving to dilute and moisten the dry meat. See FOOD. With respect to the abuse of drink, the liberty is taken of quoting a passage from Dr. Beddoes, "On the Constitution and Management of the Human Body ;"

" I allude here, as you will perceive, to the poison of fermented liquors. How wretchedly the drunkard usually perishes, you are not to be told. The miseries which the sot, in trying to compound with excess, entails upon his declining years, are somewhat less notorious. But the damage sustained by persons who, without belonging to either of these disreputable classes, have not been properly initiated in the discipline of temperance, is least of all suspected, though most deserving to be understood. The mode of living in our English universities, accompanied by the subsequent history of the members, would most completely exemplify the evil. There is nothing in the manners of the age to urge the daring spirit of youth to frequent intoxication. It is therefore to be expected that greater sobriety should come to prevail in those seminaries ; and I believe all observers will agree, that this is remarkably the fact. The more opulent students, however, almost without exception, assemble in the afternoon, and partake of the fiery wines of Portugal, or some mixture that passes

for such, and is not *less* pernicious from its strength. Others find an equivalent. The practice by slow degrees abolishes every enviable distinction of the prime of life. The whole exterior is visibly affected; and the combined talents of the painter and the philosophical anatomist could probably contrive to represent this gradual waste of youth. Signs betokening impaired alacrity, and the substitution of gloominess in the place of gaiety, begin soonest to appear. The next injury is, the loss of the happy faculty of being easily pleased. The general feeling of existence soon afterwards becomes incessantly uneasy, and the spirits, except when supported by conviviality or some elaborate amusement, constantly droop. Other excesses may help to consume the Promethean fire; and although no single circumstance will account for the general sadness of the English character, the abuse of strong beer and wine is doubtless among the principal causes. The few healthy Englishmen at least who have always refrained from them, seem by no means deficient in cheerfulness; so that the bacchanalian who declared that he would not keep company with any man that drank water but his cousin Waller (*Life of Waller the poet*), had probably no other water-drinker among his acquaintance. Do not the nations, descended from the same ancestors, differ from us at present as widely in this article of temperance as in dramatic liveliness of demeanor, and in a disposition

“ To frisk beneath the burthen of four-score ?

“ You may wish to know what evil is portended by the gloom which I have described as beginning to gather so early. The upshot depends upon pe-

ularities of constitution which we are not able to ascertain, and on accidents which we cannot foresee. As these shall dispose, it may be madness, dropsy, or palsy, preceded by the tortures of the gout. The least formidable termination is in hypochondriasis, of which thousands carry away the seeds from the seat of their academical studies. As long as they persevere in the pernicious habit, which perhaps unsuspectedly has taken root there, the advantages of a country residence, which so frequently falls to their share, can afford them no relief. The continual depression, which, together with indigestion, forms this harrassing disorder, pursues them to their retirement; and occasionally is aggravated to feelings of insupportable horror.'

DROSERA, in botany, a genus of plants, herbaceous and of small size, and very singular in their structure. The leaves are furnished with glandulous hairs on the upper surface, and fringed round the edge: these hairs have each a small globule of pellucid liquor like dew, continuing even in the hottest part of the day, and in the fullest exposure to the sun. Hence the English name "the sun-dew." The *Drosera acaulis* has a sessile flower in the bosom of the root leaves. These plants have the property of entrapping small insects within their folded leaves. This fact was discovered by Mr. Whately, who observed a fly in close imprisonment, in one of the contracted leaves, and on centrically pressing other leaves still in their expanded form, with a pin, he observed a sudden elastic spring of them so as to become inverted upwards, and as it were encircling the pin.

DROWNING, signifies an extinction of life, by a

total immersion in water. In some respects there seems to be a great similarity between death occasioned by immersion in water, and that by strangulation, suffocation in fixed air, apoplexies, &c.. In all these cases, and in drowning, there is often such a suspension of the vital powers, as has the appearance of a total extinction of them, but nevertheless they may, by proper remedies, be set in motion again and the subject be restored to life; we shall in this place give some directions with respect to persons apparently drowned. In removing the body to a convenient place, care must be taken that it be not bruised nor shaken violently, nor roughly handled, nor carried over any man's shoulders, with the head hanging downwards, nor rolled upon the ground nor over a barrel, nor lifted up by the heels; for experience proves that all those methods may be injurious, and destroy the small remains of life. The unfortunate subject should be cautiously conveyed by two or three persons; or in a carriage upon straw, lying on a bed, with the head a little raised, and kept in as natural and easy a position as possible. The body being dried with a cloth or flannel, should be placed in a moderate degree of heat, but not too near a large fire. The window or door of the room should be left open, and no more persons be admitted into it than those who are absolutely necessary, as the lives of the patients greatly depend upon their having the benefit of pure air. The warmth most promising of success is that of a bed or blanket well heated. Bottles of hot water should be laid at the bottoms of the feet, to the joints of the knees, and under the arm-pits; and a warming-pan be

derately heated, or hot bricks wrapped in cloths, should be passed over the body. The natural and kindly warmth of a healthy person lying by the side of the body, has been found in some cases, particularly of children, very efficacious.

Should the accident happen in the neighbourhood of a warm bath, brewhouse, bakehouse, glasshouse, or any other place where warm-lets, ashes, embers, grains, sand, water, &c. are easily procured, it would be of great importance to place the body in any of these moderated to a degree of heat little exceeding that of a healthy person; or in summer, the exposure to sun-shine has proved beneficial. Friction with the hand, or with warm flannel or coarse cloth, so as not to injure the skin, should also be tried with perseverance for a considerable period of time.

The subject being placed in one or other of those advantageous circumstances as speedily as possible, a bellows should be applied to one nostril whilst the other nostril and the mouth are kept closed, and the lower end of the prominent part of the wind-pipe is pressed backward. The bellows is to be worked in this situation; and when the breast is swelled by it, the bellows should stop, and an assistant should press the belly upwards to force the air out. The bellows should then be applied as before and the belly again to be pressed; this process should be repeated from twenty to thirty times in a minute, so as to imitate natural breathing as nearly as possible. Some volatile spirits heated may be held under the valve of the bellows whilst it works. If a bellows cannot be procured some persons should blow into one of the nostrils whilst

the mouth and other nostril are closed as before. If there be any signs of returning life, such as sighing, gasping, twitching; or any convulsive motions, beating of the heart, the return of the natural colour and warmth, opening a vein in the arm, or external jugular of the neck may prove beneficial, but the quantity of blood taken away should not be large. The throat should be tickled with a feather in order to excite a propensity to vomit, and the nostrils also with a feather, snuff, or any other stimulant, so as to provoke sneezing. A tea-spoonful of warm water may be administered now and then, in order to learn whether the power of swallowing be returned, and if it be, a table-spoonful of warm wine, or brandy and water, may be given with advantage; but not before, as the liquor might fall into the lungs before the power of swallowing returns. The other methods should be continued with ardour and perseverance for two hours or upwards, although there should not be the least symptom of life.

DRUIDS, the priests or ministers of religion of the antient Britons, and Gauls. The druids were chosen out of the best families; and were held, both by the honours of their birth, and their office, in the greatest veneration. They are said to have understood astrology, geometry, natural history, politics, and geography: they had the administration of all sacred things; were the interpreters of religion, and the judges of all affairs, indifferently. Whoever refused obedience to them, was declared impious and accursed; they held the immortality of the soul, and the metempsychosis; they are divided by some into several classes, as the vacerri,

DRUIDS.

441

bards, eubagib; seannach, and corontio: they had a chief, or arch-druid, in every nation; he was a sort of high priest, having an absolute authority over the rest, and was succeeded by the most considerable among his survivors. The youth used to be instructed by them, retiring with them to caves and desolate forests, where they were sometimes kept twenty years. They preserved the memory and actions of great men by their verses; but are said to have sacrificed men to Mercury. Caesar imagined that the druids came from Britain into Gaul, but several among the modern writers are of a different opinion.

From the following *Proclamation for a meeting of the Welsh bards*, at Midsummer 1798, it would appear that the institutions of the druids are not yet wholly extinct:—"In the year 1797, the sun being in Alban Hevin, or the summer solstice, an invitation was given in the hearing of the country and the government, under the period of a year and a day, with protection for all who might seek for privilege and graduation in science and bardism, to repair to the London Meeting, upon Primrose-hill; to the chair of Glamorgan, upon Tyle y Gawl; and to the chair of North Wales, at Caerwys; where there will not be a naked weapon against them; and then and there, in the presence of M. Du, Iolo Morganwg, and B. Glas, and others, bards according to the privilege of the bards of the isle of Britain, to deliver and set forth the judgment of the sessions, in the face of the sun, and in the eye of the light, on all with respect to genius and moral conduct, who may seek for presidency and privilege. And also at the time and place afore-

said, to pronounce on the merits, and to adjudge a prize, for the best translation, into Welsh, of Gray's ode, "The Bard," and relating to other matters, according to the rights and customs of the bards of the isle of Britain.

"*Y gwyf yn erbyn y byd!*"

"The truth, in opposition to the world."

DRUM, *tympanum*, is a military musical instrument in form of a cylinder, hollow within, and covered at the two ends with vellum, which is stretched or slackened at pleasure by the means of small cords and sliding knots. It is beat upon with sticks. Some drums are made of brass, but they are commonly of wood. There are several beats of the drum, as assembly, chamade, reveille, retreat, &c. The drum is known to all nations.

DRUMMER, he that beats the drum, of whom each company of foot has one, and sometimes two. Every regiment has a drum-major, who has the command over the other drums. They are distinguished from the soldiers, by cloaths of a different fashion: their post, when a battalion is drawn up, is on the flanks, and, on a march, it is betwixt the divisions.

DRUMS, *Kettle*, are two sorts of large basons of copper or brass, rounded in the bottom, and covered with vellum or goat-skin, which is kept fast by a circle of iron, and several holes fastened to the body of the drum, and a like number of screws to screw up and down. They are much used among the horse, as also in operas, oratorios, concerts, &c.

DRUNKENNESS, a well known affection of the brain occasioned by drinking too freely of intoxicating

liquor. Drunkenness appears in different constitutions: some it makes gay, some sullen, and some furious. The mischief of drunkenness consists in the following bad effects. 1. It betrays most constitutions either into extravagances of anger, or sins of lewdness. 2. It disqualifies men for the duties of their station, both by the temporary disorder of their faculties, and at length by a constant incapacity and stupefaction. 3. It is attended with expences, which can often be ill spared. 4. It is sure to occasion uneasiness to the family of the drunkard. 5. It shortens life. To these consequences of drunkenness must be added the peculiar danger and mischief of the example. "Drunkenness" (says Paley) "is a social festive vice. The drinker collects his circle; the circle naturally spreads; of those who are drawn within it, many become the corrupters and centres of sets and circles of their own; every one countenancing, and perhaps emulating the rest, till a whole neighbourhood be infected from the contagion of a single example. With this observation upon the spreading quality of drunkenness may be connected a remark which belongs to the several evil effects above recited. The consequences of a vice, like the symptoms of a disease, though they be all enumerated in the description, seldom all meet in the same subject. In the instance under consideration, the age and temperature of one drunkard may have little to fear from inflammations of lust or anger; the fortune of a second may not be injured by the expence; a third may have no family to be disquieted by his irregularities; and a fourth may possess a constitution fortified against the poison of strong liquors."

But if, as we always ought to do, we comprehend within the consequences of our conduct, the mischief and tendency of the example, the above circumstances, however fortunate for the individual, will be found to vary the guilt of his intemperance less, probably, than he supposes. Although the waste of time and money may be of small importance to you, it may be of the utmost, to some one or other whom your society corrupts. Repeated or long continued excesses which hurt not your health, may be fatal to your companion! Although you have neither wife nor child; nor parent, to lament your absence from home, or expect your return to it with terror; other families, whose husbands and fathers have been invited to share in your ebriety, or encouraged to imitate it; may justly lay their misery or ruin at your door. This will hold good, whether the person seduced, be seduced immediately by you, or the vice be propagated from you to him through several intermediate examples."

With regard to the theory of drunkenness, it may be observed, that the common and immediate effect of wine is to dispose to joy, that is to introduce such degrees of vibrations into the nervous system as are attended with a moderate degree of pleasure. This it seems to do by impressing agreeable sensations on the stomach, which are thence propagated to the brain, continue there, and call up the several associated pleasures that have been formed from pleasant impressions made upon the alimentary duct. The sickness and head-ach which drunkenness occasions the succeeding morning, arise, probably, from the immediate impressions

made on the nerves of the stomach, and from the sympathy which the parts of the head have with the brain, the part principally affected in drunkenness, by deriving their nerves immediately from it.

Drunkenness is punishable by fine and imprisonment, and in law, is no excuse for any crime committed during the paroxysm.

DRYADS, *dryades*, in the heathen theology, a sort of deities, or nymphs, which the ancients thought inhabited groves and woods. They differed from the Hamadryades, these latter being attached to some particular tree, with which they were born, and with which they died; whereas the dryades were goddesses of trees and woods in general. Mention is also made of a kind of prophetesses, or witches, among the Gauls, called dryades or druids. See DRUIDS.

DRY-ROT is so called by architects in contradistinction only to the more usual circumstances of decay to which wood is liable: such a designation however does not appear the most eligible, as it is now sufficiently ascertained to arise only from moisture. The Dry-rot, as it is called, then consists in a more or less rapid decomposition of the substance of the wood from moisture deposited on it by condensation: to the action of which it is more disposed in certain situations than in others; and this moisture operates more quickly on wood which most abounds with the saccharine, or fermentible principle of the sap. In a work* professedly written on the subject, appears the following remarks; "Several pieces of fir-wood having been promis-

* Randall's Philosophical Enquiry.

cuously thrown together in a moist situation and left there only a few weeks, were, upon being accidentally removed, found in a high state of fermentation, and almost wholly enveloped in a film of white mould, which on further examination appeared to be a complete fungus." This fact appears satisfactory, in as far as it sheweth that where a sufficient degree of humidity takes place, and other things favorable to give the stimuli to the fermentation, the dry-rot is produced.—The pine or fir, of which wood most of our buildings are timbered, is known to contain a considerable portion of saccharine matter, which is easily fermented under favorable circumstances, when the tree is green or newly felled; and not secure from it when more seasoned.—In confined situations, as in the constructions of a building, and when the wood is green, a great degree of fermentation always takes place, and the atmosphere* in this situation not having sufficient power to disperse and neutralise the gases evolved from such a state, they afford a direct pabulum to the fungus plant, which when fecundated; grows and spreads itself over the surface of the wood, walls and every contiguous substance.—Oak-wood is not so soon infected as the fir, nor when it is, is it so rapidly destroyed; which perhaps is the cause why in France so little has been written concerning it, in which country they gene-

* The expedient of letting in air seems to have been particularly attended to by the ingenious architects of our gothic churches, who with that view left various openings in the walls between the two roofs of those edifices.

really employ it in their buildings ; but that it does suffer, as well as other woods, from this rot, there is abundant proof in our own houses when it happens to be employed in them ; as well as in our ships : to prevent it in the latter of which, as well as in the former, numerous experiments have been tried with very little or no benefit to the public.—Some buildings have it from the locality of their situations, others from the nature of the material employed, and some from a too rapid finishing. When it takes place from situation, viz. damp-walls near the earth's surface, it is generally if not universally occasioned by the percolation of water from the higher adjoining grounds, which thus intercepted in its current attempts to follow the general hydrostatic law of elevating itself by the syphon line, to a height equal to that from whence it had its origin. Drains made athwart the ascending ground, with very little descent or fall, and made of the depth of one yard for each yard of ascent, and from the foundation, until equal to the height that such damp ever arises, would in most cases prove a prevention for the dry-rot where it originated from extreme moisture. When the cause arises from the state of the material, or from the too rapid finishing, or indeed any other stimulus, the effectual remedy is to char, or carbonise the surface of the wood, which may be easily done in as far as concerns the timbering of a building by exposing it to the operation of fire, and this may be very much facilitated by previously washing the surface with a solution of nitre, and this process would still be more complete, if the wood was slightly wrought or planed.—At a villa in the neighbourhood of Lon-

don, in which this rot had been discovered by protruding itself through the skirting, dado, &c. of the principal rooms; these having been removed as well as the flooring boards, the girders and other timbers were found in a state of decay, so much so that it was deemed expedient to remove the whole, which having been done, the new timber with such of the old as was found fit to be replaced, were all well charred, as also the flooring boards, which being only partially infected, it was not deemed necessary to replace by new ones, and in addition to their being charred they were washed with a solution of the sulphate of iron:—this repair has now been made several years, in a situation too of extreme moisture, and where the dry-rot had been almost an annual visitor, and was effected at much less expence than any previous repair for it, in consequence of much of the old wood having been charred and replaced, which was never done in previous repairs.—Gloster Lodge has since been also repaired for this rot, adopting, as far as its timbering was concerned, the mode of preparing it herein recommended, and if builders in general were to aspire to a praise so heroic as that of disinterestedness, and make use of it for their employers in cases which come under their notice, scenes of decay destructive of some of the best structures the country can boast, would be avoided.—It might be also employed to secure the timbering of our ships; it offers every facility, by the assistance of chemistry, of being accomplished to the slightest material made use of. It is well known that most of the acids possess the power of charring in proportion to the force with which they retain their oxygen. Charcoal has long been

known as indestructible ; the ancients were acquainted with it, as is obvious from the piles on which the famous Temple of Ephesus was built having been so prepared, nor have there been wanting instances within our own knowledge. This indestructibility given to wood by charring, arises, according to Dr. Bancroft, from its absorption of oxygen, in which state he remarks it will resist the combined action of the sun, air, and moisture for hundreds of years. Dr. Parry also observes " that he had read that charcoal buried in the moist earth had come down to us perfectly sound from the times of the Romans, and that posts long withstood the same moisture, if the part intended to be put into the ground was charred all round to a certain depth. Impressed with these facts, he determined to try an artificial coat of charcoal ; and when new water shoots were constructed, he strongly and carefully rubbed them with a coat of drying oil, which he dredged all over with a thick layer of charcoal finely powdered and contained in a muslin bag. After 2 or 3 days when the oil was thoroughly dry, and firmly retained the greatest part of the charcoal, he brushed off what was loose, and over that which adhered a coat of common paint was applied, and in a few days after, a second ; the whole became a firm and solid crust, after which the shoots were put into their places, and being examined many years afterwards appeared perfectly sound. He does not think lamp black, which is a pure species of charcoal, would have answered the purpose of forming a thick defensive covering so well as the grosser charcoal which he used ; but whatever sort of charcoal is employed, it ought

either to be *fresh made*, or heated again in close vessels, so as to expel the water which it greedily attracts from air.—This was an ingenious contrivance by way of experiment, but the sheets might have been charred; but if charcoal put on in this way protects the surface on which it is applied, very beneficial results would be derived in cases of dry-rot by adopting it to all light wainscoting and other wood-work which is fixed to walls, where charring by the common mode might warp and injure it. Dr. Darwin, who was fond of speculating, “supposed that the rot of wood might be entirely prevented by soaking dry-timber first in lime water, till it had absorbed as much of it as may, and then after it is dry by soaking it in a weak solution of vitriolic acid in water; which will unite with the lime already deposited in the pores of the timber, and convert it into gypsum: which he supposes will not only preserve it from decay for many centuries, if it be kept dry, but also render it less inflammable.—He also conceives that beams so impregnated would be less liable to swag, and boards so prepared less liable to warp.” In the immense salt mines of Hungary, many large wooden props which support the roof, and are perpetually moistened with salt water trickling down them, are said to have suffered no decay for many centuries.

The reader is referred for a fuller account of this subject to Mr. Randal’s “Philosophical Enquiry.”

DUCTILITY, a property of certain bodies, whereby

* Phytologia.

they are capable of being expanded, or stretched forth, by means of a hammer, press, &c. The great ductility of some bodies, especially of gold, is very surprizing: the gold beaters and wire-drawers furnish us with abundant proofs of this property: a single grain of gold may be beat into an extent of several square inches, and yet the leaf remain so compact, as not to transmit the rays of light, and Dr. Halley found that a small cube of gold, whose side is the 1-100th part of an inch only, contains 2,483,000 visible parts. M. Reaumur shews that in the common way of drawing gold-wire, a cylinder of silver 22 inches long and $1\frac{1}{2}$ inch in diameter is stretched to 1,163,520 feet, or is 634,692 times longer than before, which amounts to about 97 leagues. To wind this thread on silk for use, they first flatten it, in doing which, it stretches one-fourth more, so that the twenty-two inches are now extended to about 120 leagues in length. Glass is also very ductile, and may be spun out into exceedingly fine threads. Our ordinary spinners do not form their threads of silk, flax, &c. with half the expedition as the glass-spinners do threads of this brittle matter. The method of performing this is as follows: There are two workmen employed; the first holds one end of a piece of glass over the flame of a lamp, and when the heat has softened it, a second operator applies a glass hook to the metal thus in fusion, and, withdrawing the hook again, it brings with it a thread of glass, which still adheres to the mass, then fitting his hook on the circumference of a wheel about 20 inches in diameter; he turns the wheel as fast

as he pleases; which drawing out the thread, winds it on its run, till it is covered with a skein of glass-thread. The mass in fusion over the lamp, diminishes insensibly, being wound out like a clue of silk upon the wheel; and the parts as they recede from the flame, cooling, become more coherent to those next to them, and this by degrees: the parts nearest the fire are always the least coherent, and of consequence must give way to the effort that the rest make to draw them towards the wheel. It is said that the flexibility of glass increases in proportion to the fineness of the thread, and that, probably, had we but the art of drawing threads as fine as a spider's web, we might weave stuffs and cloths of them for wear.

DUEL, a single combat, at a time and place appointed, in consequence of a challenge. This custom came originally from the northern nations, among whom it was usual to decide all their controversies by arms. Both the accuser and accused gave pledges to the judges on their respective behalves; and the custom prevailed to far among the Germans, Danes, and Franks, that none were excused from it but women, sick people, cripples, and such as were under twenty-one years of age, or above sixty. Even ecclesiastics, priests, and monks were obliged to find champions to fight in their stead. The punishment of the vanquished was either death, by hanging or beheading; or, mutilation of the members, according to the circumstances of the case. Duels were at first admitted, not only on criminal occasions, but on some civil ones for the maintenance of rights to estates, and

the like: in latter times, however, before they were entirely abolished, they were restrained to these four cases: 1. That the crime should be capital. 2. That it should be certain the crime was perpetrated. 3. The accused must, by common fame, be supposed guilty. And 4. The matter not capable of proof by witnesses. In England, though the trial of duel is disused, the law on which it is founded is still in force. Duel at present, is used for a single combat on some private quarrel, and must be premeditated, otherwise it is called a rencountre. If a person be killed in a duel, both the principals and seconds are guilty of murder, whether the seconds engage or not. It is also a very high offence to challenge a person, either by word or letter, or to be the messenger of a challenge. The severe edicts made by Lewis XIV. against duels, did in a great measure put a stop to the custom in France.

Duke is either the title of a sovereign prince, as the duke of Savoy, Parma, &c. the grand duke of Tuscany, Moscow, &c. or it is the title of honour and nobility next below princes. The commanders of armies in time of war, the governors of provinces, and wardens of marches, in time of peace, were called *duces*, under the latter emperors. The Goths and Vandals divided all Gaul into duchies and counties, the governors of which they sometimes call *duces*, and sometimes *comites*. In France, under the second race of kings, though they retained the name and form of ducal government, there were scarcely any dukes except those of Burgundy, Aquitain, and France. In England, among the Saxons, the commanders of armies, &c. were

called dukes, *dutes* without any addition, till Edward III. made his son, the black prince, duke of Cornwall; after whom there were more made in the same manner, the title descending to their posterity. Duke, then, at present, is a mere title of dignity without giving any domain, territory, or jurisdiction over the place from whence the title is taken. A duke is created by patent, cincture of sword, mantle of state, imposition of a cap and coronet of gold on his head, and a verge of gold put into his hand. His title is Grace; and, in the style of the heralds, Most noble prince.

DUMBNESS, the privation of the faculty of speech. The most general or rather the sole cause of dumbness is the want of the sense of hearing. The use of language is originally acquired by imitating articulate sounds. From this source of intelligence deaf people are entirely excluded; they cannot acquire articulate sounds by the ear: unless, therefore, articulation be communicated to them by some other medium, these unhappy people must for ever be deprived of the use of language; and as language is the principal source of knowledge, whoever has the misfortune to want the sense of hearing must remain in a state little superior to that of the brute creation. See **DEAFNESS**.

DUNKERS, or *tunkers*, a sect of Christians peculiar to America, which arose about the year 1724, and formed a kind of commonwealth, the principal seat of which is Pennsylvania. The dunkers baptize by immersion; dress like dominican friars; never shave their heads or beards; have different apart-

ments for the two sexes ; subsist chiefly on vegetables, indulging in mutton only at love-feasts ; allow themselves no bed, unless in sickness, using, in their separate cells, benches to lie upon, and blocks of wood for pillows. Their principal idea of discipline is the mortification of the body ; and doctrinal tenet, the denial of the eternity of punishment. Their common appellation, *harmless-dunkers*, conveys an idea of their character in one word.

DUODECIMALS, in arithmetic, are numbers proceeding in a proportion of twelves ; in the same way as decimals proceed in a proportion of tens. This way of conceiving an unit divided is chiefly in use among artificers, who generally take linear dimensions of their work in feet, inches, and twelfth parts of an inch. In squaring their dimensions, duodecimals are multiplied into duodecimals, and the operation is called "cross-multiplication ;" Rule. Under the multiplicand write the corresponding denominations of the multiplier : multiply each term in the multiplicand, beginning at the lowest, by the feet in the multiplier, and write the result of each under its respective term, observing to carry an unit for every twelve, from each lower denomination to its next superior. In the same manner, multiply all the multiplicand by the prime in the multiplier, and set the result of each term one place removed to the right hand of those in the multiplicand. Do the same with the seconds in the multiplier, setting the result of each term two places removed to the right hand of those in the multiplicand. Proceed in like manner with all the rest of the denominations, and their sum, when

added together, gives the answer: the following example will illustrate the rule;

Ex. multiply $\begin{array}{r} \text{ft. in.} \\ 9 \ 9 \ 4 \\ 3 \ 4 \ 3 \end{array}$ by $\begin{array}{r} \text{ft. in.} \\ 3 \ 4 \ 3 \end{array}$

$$\begin{array}{r} 29 \ 4 \ 0 \\ 3 \ 3 \ 1 \ 4'' \\ 2 \ 5 \ 4 \ 0'' \end{array}$$

Ans. $32 \ 9 \ 6 \ 8 \ 0$ Feet.

Dyeing, the art of giving a lasting colour to silks, cloths, and other substances, whereby their beauty is much improved, and value enhanced. This art depends chiefly on three things, viz. 1. Disposing the surface of the stuffs to receive and retain the colours; which is performed by washing them in different lyes, digesting, beating, &c.; by means of which the viscous gluten of the silk-worms naturally adhering to their threads, is washed and cleansed from them, and thus they become fitted gradually to imbibes the colours. By these also the greasy foulness adhering to wool and flax is scoured off. See **CLOTH**. 2. So to grind the colours, as that they may enter the body duly prepared, and preserve their brightness undiminished. 3. The third consists in having beautiful colours.

Dyeing properly so called is a chemical process; and in order that it may succeed, it is necessary that the colouring matters should be dissolved in some fluid, and that their attraction to that fluid should be less than that to the stuff. The

stuff receives the dye better in proportion to the degree of affinity which the colouring matter has to it, and to the solvent relatively, for if the attraction to the stuff is much more than to the solvent, the stuff receives the dye too rapidly; if on the other hand its attraction to the solvent is too great, the stuff will either not take the dye at all, or it will take it very slowly and faintly. Wool has a stronger attraction for colouring matters than silk, silk than cotton, and this latter a stronger than linen. The essential circumstances in dyeing are to ascertain the affinities of the colouring substance; first, to the solvents; secondly, to those substances which modify its colour, increase its brilliancy, and strengthen its union with stuff; thirdly to the different agents which may change the colour, and principally to air and light. In dyeing the title of Mordant is applied to these substances which serve as intermedia between the colouring particles and the stuff to be dyed, either for the purpose of facilitating, or of modifying their combination, and by their means colours are varied, brightened, made to strike, and rendered more durable. If a sufficient number of colouring matters could be procured which had an affinity to cloth sufficient to answer all the purposes of dyeing, the art would be exceedingly simple and easy. But except indigo there is scarcely a dye-stuff which yields of itself a good colour sufficiently permanent to deserve the name of a dye. This difficulty is obviated by employing an intermediate substance, which has a strong affinity both for the stuff and the colouring matter, and this is the chief purpose

for which the mordant is used. The principal substances employed as mordants are aluminous salts, lime, metallic oxydes, some astringent substances, and animal matters. The three simple colours in dyeing are red, yellow, and blue; all other colours are compounded of these. Different shades or tints of the same colour are produced by using different drugs, or by varying the quantity of colouring particles, or in the case of compound colours, by varying the proportion of the different simple ones, of which they are composed.

Reds are produced by cochineal, kermes, and gum lac among the animal productions: and madder, archil carthamus and Brazil-wood among the vegetable.

Yellows are produced by vegetable substances only, as weld, fustic, arnotta, quercitron bark and sumack.

The principal *blues* are from indigo, wood, log-wood and Prussian blue.

The principal compound colours are produced by mixing the simple in the dyeing liquor, or by dyeing the stuff first in a bath of one simple colour, then in that of another.

DYNAMICS signify properly the science of moving forces; but mathematicians, by this term, understand the science of the motion of such bodies as impel one another.

DYNASTY, among historians, signifies a race or succession of kings of the same line or family: such were the dynasties of Egypt.

E.

E, the fifth letter in the alphabet, and the second vowel, has different pronunciations in most languages. The Greeks have their *ε* and *η*, or long and short *e*. The French have their *e* open, *e* masculine, and *e* feminine or mute. In English there are three kinds of *e*, open or long, as in *wear*, *bear*; short, as in *wet*, *kept*, and mute as in *love*, *come*, &c. As a numeral, E stands for 250. In Sea-charts E stands for East: E by N. and E by S. East by North, and East by South.

EAGLE. See **FALCO**.

EAGLE, in heraldry, the eagle is accounted one of the most noble bearings in armory, and, according to the learned in this science, ought to be given to none but such as greatly excel in the virtues of generosity and courage, or for having done singular services to their sovereigns.

Among the ancients, the eagle was held sacred to Jupiter, and on that account placed on his sceptre. It is well known that the Romans had the greatest veneration for it, looking upon it as the talisman of their state, and taking it for their principal ensign. It was either of gold or silver, borne singly on the point of a pike, till the time of Constantine, when the empire being divided into the eastern and western, the eagle was afterwards represented with two heads.

EAGLE, *Black*, an order of knighthood, instituted by the elector of Brandenburg, in 1701, on his

being crowned king of Prussia. The knights of this order wear an orange-coloured ribband, suspending a black eagle.

EAGLE, White, a similar order in Poland, instituted in 1325, by Uladislaus V. on occasion of the marriage of his son Casimir to the daughter of the great duke of Lithuania. The knights of this order wear a chain of gold suspending a silver eagle, crowned.

EAGLET, a diminutive of eagle, properly signifying a young eagle. In heraldry, when there are several eagles on the same escutcheon, they are termed eaglets.

EAR, in anatomy, the organ of hearing. A very delicate and fine membrane carried along through the cavities of the labyrinth, is formed of an expansion of the auditory nerve, and is the primary part of the organ of hearing, as the retina is formed of the expansion of the optic nerve, and is the primary organ of seeing.

EAR-PICK, an instrument of ivory, silver; or other metal, somewhat in form of a probe, for cleaning the ear. The Chinese have a variety of these instruments, with which they are very fond of tickling their ears; but this practice, as Sir Hans Sloane judiciously observes, must be prejudicial to so delicate an organ, by bringing too great a flow of humours on it.

EARL, a British title of nobility, next below a marquis, and above a viscount. Earls were anciently called *comites*, because they were wont *comitari regem*, to wait upon the king for council and advice. The Germans call them *graves*, as *landgrave*, &c.

grave, palgrave, rheingrave ; the Saxons ealdormen, unless that title might be more properly applied to our dukes ; the Danes, eorlas ; and the English, earls. The title, originally, died with the man. William the conqueror first made it hereditary, giving it in fee to his nobles, and allotting them for the support of their state the third penny out of the sheriff's court, issuing out of all pleas of the shire whence they had their title. At present, an earl is created by cincture of sword, mantle of state put upon him by the king himself, a cap and coronet put upon his head, and a charter in his hand. The title is accompanied by no territory, private or judicial rights, but confers nobility, and an hereditary seat in the highest assembly in the nation.

EARL marshal of England, is a great officer who had anciently several courts under his jurisdiction, as the court of chivalry, and the court of honour. Under him is also the herald's office, or college of arms. He has some pre-eminence in the court of marshalsea, where he may sit in judgment against those who offend within the verge of the king's court. This office is of great antiquity in England, and anciently of greater power than now ; and has been for several ages hereditary in the noble family of Howard.

EARTH, in astronomy and geography, one of the primary planets, being this terraqueous globe whereon we inhabit.

The figure of the *Earth* was accounted by some of the ancients to be like that of an oblong cylinder ; by others, of the form of a drum, and by others

flat. The moderns demonstrate it to be nearly spherical from the following, among other considerations. 1. All the appearances of the heavens, both at land and at sea, are the same as they would be if the earth were a globe. 2. In eclipses of the moon, which are caused by the shadow of the earth falling upon the moon, this shadow is always circular; and a body can be no other than a globe, which in all situations casts a circular shadow. 3. Several navigators have sailed quite round the globe, steering their course directly south and west till they came to the Magellanic sea, and thence to the north and west, till they returned to their port from the east; and all the phenomena which should naturally arise from the earth's roundness, happened to them. Besides, their method of sailing was also founded upon this hypothesis, which could never have succeeded so happily, if the earth had been of any other figure. It is true, the surface of the earth is not an exact geometrical globe; but the inequalities are so inconsiderable, that the highest mountain bears no greater proportion to the bulk of the earth, than a grain of dust does to a common globe. The figure of the earth, then, was reckoned by mathematicians and geographers as perfectly spherical, excepting the small inequalities on its surface, of mountains and valleys; till an accident engaged the attention of sir Isaac Newton, and M. Huygens, who demonstrated from the laws of hydrostatics, and the revolution of the earth about its axis, that its figure was not a true sphere, but an oblate spheroid flattened towards the poles. Not only the figure of the earth has been

ascertained, but its magnitude, and it is found that its diameter is equal to 7,958 miles in length. Circumference 25,000. Superficies 198,944,308 square miles. Solidity 26,393,000,000 cubic miles. It is also imagined that the unexplored portions of the earth and seas contain 160,522,026 square miles, the inhabited part of the earth is equal to 38,422,180, in the following proportions,

Europe - - - - 4,456,065

Asia - - - - 10,968,423

Africa - - - - 9,654,817

America - - - - 14,142,875

“ Motion of the Earth.” The earth has a triple motion. 1. A diurnal motion round its own axis, from west to east, in twenty-four hours, which occasions the perpetual succession of days and nights. 2. An annual motion round the sun in a year, which produces the different seasons, and the lengthening and shortening of days. 3. That motion by which the poles of the world revolve about the poles of the ecliptic, and occasion what is commonly called the precession of the equinoxes, or more properly, the retrogression of the earth's nodes.

Earth, in gardening and husbandry, if good, should be of a blackish colour, gravelly, fat, pliant, or easy to be digged; it should neither be cold nor light, it ought to have no ill smell or taste, and it should be of the same quality three or four feet deep for trees, which, if they have not that depth, will languish and decay after they have been planted five or six years. Fruit trees will thrive in a less depth, and they generally produce the

most generous fruits, when their roots spread near the surface of the earth. Husbandmen call that new earth which, lying three or more feet deep, never served to the nourishment of any plant; or earth that has been a long time built upon, though it had formerly bore; earth likewise of a sandy loamy nature, where cattle have been a long time fed, may be accounted such, and be of excellent use for most sorts of plants, especially if it has been thrown up in heaps to grow richer.

EARTHQUAKE, in natural history, a violent agitation or trembling of some considerable part of the earth, generally attended with a terrible noise like thunder, and sometimes with an eruption of fire, water, wind, &c. Earthquakes and volcanoes are both produced from the same cause, which may be thus explained: those countries which yield great store of sulphur and nitre, or where sulphur is sublimed from the pyrites, are by far the most injured and incommoded by earthquakes; for where there are such mines, they must send up exhalations, which meeting with subterraneous caverns, must adhere to the arches of them, as soot does to the sides of our chimnies; where they mix themselves with the nitre or saltpetre which comes out of these arches (in like manner as we see it come out of the inside of the arch of a bridge) and so make a kind of crust which will very easily take fire. There are several ways by which this crust may take fire, viz. 1. By the inflammable breath of the pyrites, which is a kind of sulphur that naturally takes fire of itself. 2. By a fermentation of vapours to a degree of heat, equal to that of fire.

and flame. 8. By the falling of some great stone which is undermined by water, and striking against another; produces some sparks that set fire to the neighbouring combustible matter, which being a kind of natural gunpowder, at the appulse of the fire goes off with a sudden blast or violent explosion, rumbling in the bowels of the earth, and lifting up the ground above it, so as sometimes to make terrible havoc and devastation, till it gets vent or a discharge. Burning mountains and volcanoes are only so many spiracles serving for the discharge of this subterranean fire, when it is thus assembled; and where there happens to be such a structure and conformation of the interior parts of the earth, that the fire may pass freely and without impediment from the caverns therein, it gathers into these spiracles, and then readily and easily gets out from time to time without shaking or disturbing the earth; but where a communication is wanting, or the passages are not sufficiently large and open, so that it cannot come at these spiracles, without first forcing and removing all obstacles, it heaves up and shocks the earth, till it hath made its way to the mouth of the volcano; where it rushes forth, sometimes in vast flames, with great velocity, and a loud hollowing noise.

Earthquakes are sometimes confined to a narrow space, which is properly the effect of the reaction of the fire; and they shake the earth just as the explosion of a powder-magazine causes a sensible concussion at the distance of several leagues. Thus a violent eruption of *Mount Etna*, will cause an earthquake over all the island of *Sicily*; but it will

never extend to the distance of three or four hundred leagues. In like manner, when some new vents of fire have been formed in mount Vesuvius, there are felt at the same time earthquakes at Naples, and in the neighbourhood of the volcano; but these concussions have never shaken the Alps, nor been communicated to France, or other countries remote from Vesuvius. Sometimes they are felt at considerable distances, and shake a long tract of ground without any interruption or volcano appearing. There are instances of earthquakes which were felt at the same time in England, France, Germany, and Hungary, and these always extend a great deal more in length than in breadth: the earthquake, on the 1st of Nov. 1755, which destroyed Lisbon, extended from north to south 2500 miles with the utmost violence; it appears to have begun in Greenland, and passing southward was felt in the islands of Trinity, Ferro, some of the western isles of Scotland, in Ireland, in the south-west part of England, &c. and passing under the ocean shook all Portugal and great part of Spain, whence it passed to the continent of Africa with incredible violence, and having terrified the kingdoms of Fez and Morocco, probably vented itself in the southern ocean. Earthquakes shake a tract of ground with more or less violence in different places, in proportion as it is remote from the fire; and they are almost always accompanied with a dull noise like that of a heavy carriage rolling along with great rapidity.

EARTH, in chemistry. The word *earth*, in common language, has two meanings; it sometimes

signifies the globe that we inhabit, in which sense it has been illustrated in the preceding articles, and sometimes the mould in which vegetables grow. This mould has been analysed by chemists, and found to consist of a variety of substances, without order or regularity. The larger portion, however, of its materials, are a number of small bodies, having several properties, in the possession of which they resemble each other; and these are classed together, and denominated earths.

Every body, then, that has the following properties, is an earth:

1. Insolubility in water; at least when combined with carbonic acid. 2. Little or no taste or smell; at least when combined with carbonic acid. 3. Incombustibility; and incapability, while pure, of being altered by fire. 4. A specific gravity not exceeding 4.9. 5. Capability of assuming, when pure, the form of a white powder.

The earths at present known are eight in number:

1. lime, 2. magnesia, 3. barytes, 4. strontites, 5. alumina, 6. silica, 7. jargonia, 8. glucina.

The characteristics above recited are not, perhaps, rigorously applicable to each of the species; but these bodies are similar in a number of properties, sufficient to render their classification under one head convenient.

1. Lime is found in every part of the world. It is discovered in its purest state in limestone, marbles, and chalk: none of these substances are strictly speaking, lime; but they are all capable of becoming lime by a well-known process, by keeping them for some time in a white heat: this pro-

cess is called the *burning of lime*: the product is denominated quicklime: this last substance is what is called *lime*.

2. Magnesia was first known in the beginning of the eighteenth century, when a Roman canon offered it, under the name of *magnesia-elen*, as a cure for all diseases. It is prepared in the following manner: sea-water, and the water of many springs similar to those of Epsum, contain a salt called sulphat of magnesia, and composed of the earth in question and sulphuric acid. This salt is dissolved in water, and half its weight of potass added. The magnesia is immediately precipitated; because potass has a stronger affinity for the sulphuric acid: it is then to be washed with a sufficient quantity of water, and dried.

3. Berytes is an earth contained in a very heavy mineral found in Sweden, Germany, and Britain.

4. Strontites, an earth contained in the Strontian mineral, which has been found in Ayrshire, and near Bristol, in England; in Pennsylvania, in the United States; and in France and Sicily; and is of a white colour.

5. If one part of powdered flints or sand, mixed with three parts of potass, be put into a crucible, and kept in a melted state for half a hour, a brittle substance is produced which may be dissolved in water; and, an acid being poured into the solution, which is called *liquor siliceus*, or liquor of flints, a white, spongy substance is precipitated: this substance, which, when dry, is a soft white powder, without either taste or smell, is called *siliceous earth*, or *silica*.

6. *Alumina* is an earth obtained from alum, dissolved in hot water.

7. *Jargonia*, contained in a precious stone, called the *jargon* or *zircon*.

8. *Glucina*, an earth discovered by M. Vauguelin in the *beryl*.

The first four of these earths are sometimes called *alkaline earths*. See **VOLTAISM**, under which article will be given some account of the decomposition of several of these earths.

EASTER, a festival of the Christian church, observed in memory of our Saviour's resurrection. The Greeks and Latins call it *pascha*; an Hebrew word signifying *passage*, applied to the Jewish feast of the passover, to which the Christian festival of Easter corresponds. It is called Easter in the English, from the goddess Eostre, worshipped by the Saxons with peculiar ceremonies in the month of April.

It is appointed by our rubric that Easter shall be celebrated upon the first Sunday after the first full moon immediately following the 21st of March. It requires some calculation to find the true time of Easter, unless we first know when the full moon happens: to save this trouble we shall give a table by which it will easily be found.

EASTER.

By the following Table, Easter-Sunday may be found for any year during the present century, by knowing the GOLDEN NUMBER and DOMINICAL LETTER, which see.

Golden Number	Paschal Moon	Sunday Letter
14	MARCH 21	C
3	22	D
	23	E
11	24	F
	25	G
10	26	A
8	27	B
	28	C
16	29	D
5	30	E
	31	F
13	APRIL 1	G
2	2	A
	3	B
10	4	C
	5	D
18	6	E
7	7	F
	8	G
15	9	A
4	10	B
	11	C
12	12	D
1	13	E
	14	F
9	15	G
	16	A
17	17	B
6	18	C

The use of this table is as follows : Look for the golden number of the year in the first column, against which stands the day of the paschal full moon ; then look in the third column for the dominical letter, next after the day of the full moon, and the day of the month standing against that letter is Easter-Sunday. When the full moon happens on a Sunday, then the following Sunday is Easter-day.

Examples. In 1811, the golden number is seven, against which is April 7th, and the dominical letter being F, (the letter which is opposite to the 7th of April) Easter-day will be the Sunday after, or the 14th of April.

EASTLAND company, a company of merchants incorporated in the 21st of the reign of queen Elizabeth, and impowered to trade to all places within the Sound, except Narva, the only Russian port at that time in the Baltic. This company is at present inconsiderable, the trade to Norway and Sweden having been laid open to private merchants, by act of parliament.

EAST-INDIA company, a company of merchants trading to the East Indies, and Canton, Amoy, and Ghusan, ports of China, incorporated about the 48d of queen Elizabeth, A. D. 1600, and impowered to trade to countries to the eastward of the Cape of Good Hope, exclusive of all others. About the year 1698, application being made to parliament by private merchants, for laying this trade open, an act passed empowering every subject of England, upon raising a sum of money, for the supply of the government, to trade to those parts. A great subscription was accordingly raised, and the subscribers were styled the New-East-India Company; but

the old establishment being in possession of all the forts on the coast of India, the new one found it its interest to unite ; and both, trading with one joint stock, have ever since been known under one name, viz. *The United East India Company.*

In the age of Nero, the East India trade was carried on by the river Nile ; the merchandize proceeded in caravans to the Red Sea, where it was embarked for the Indian Ocean. The specie annually carried from Rome, upon this account, amounted, according to Pliny's computation, to about 300,000*l.* sterling ; and the usual returns, which arrived in December and January, yielded, in clear gain, an hundred for one.

EBONY, the wood of a tree supposed to be of the palm kind, which is imported from different countries of the East and West Indies. This wood is extremely solid, and capable of a fine polish ; and, therefore, much used in toys and marquetry.

ECHO, a sound reverberated or reflected to the ear from some solid body. As the undulatory motion of the air, which constitutes sound, is propagated in all directions from the sounding body, it will frequently happen that the air, in performing its vibrations, will impinge against various objects, which will reflect it back, and so cause new vibrations the contrary way : now if the objects are so situated as to reflect a sufficient number of such vibrations as proceed different ways to the same place, the sound will be there repeated, and is called an echo ; and the greater the distance of the object is, the longer will be the time before the repetition is heard : and when the sound, in its progress, meets with objects at different distances, sufficient to pro-

Since an echo, the same sound will be repeated several times successively, according to the different distances of these objects from the sounding body, which makes what is called a repeated echo. See ACOUSTICS.

ECLECTICS, ancient philosophers, who, without attaching themselves to any particular sect, selected whatever appeared to them the best and most rational from each.

ECLIPSE, in astronomy, the deprivation of the light of the sun, or of some heavenly body, by the interposition of another heavenly body between our sight and it. A total eclipse of the sun or moon is when their whole bodies are obscured; and a partial one is when part only of their bodies is darkened: a central eclipse is when it is not only total, but the eclipsed body passes through the centre of the shadow. In explanation of eclipses, the mind must figure to itself the body of the sun, irradiating the earth on one side of its globe, which, being a solid body, intercepts the rays, and therefore projects a long shadow from its opposite side; now, when the moon happens to come in a line with this shadow, it falls upon her, and she is eclipsed. If she is in a direct line with the earth, she is wholly overshadowed, that is, suffers a total eclipse; but if she be in some degree without this direct line, on either side, then there only ensues a partial eclipse, her whole orb not being, in this case, at any period of the eclipse, obscured.

An eclipse of the sun happens when the moon passes between the earth and that body, and thus intercepts his rays. In this case, an inhabitant of

the moon would observe a partial *eclipse of the earth*.

An eclipse of the sun never happens but at a new moon ; nor one of the moon but when she is at her full.

ECLIPTIC, in astronomy, a great circle of the sphere, supposed to be drawn through the middle of the zodiac ; or, more strictly speaking, that path or way among the fixed stars, that the earth appears to describe, to an eye placed in the sun. It is called ecliptic, by reason that all eclipses happen when the planets are in or near its nodes.

ECLIPTIC, in geography, a great circle on the terrestrial globe, not only answering to, but falling within the plane of the celestial ecliptic.

ECLOGUE, in poetry, a kind of pastoral composition, or a small elegant poem, in a natural simple style.

ECONOMY, *political*, is the science which treats of the wealth of nations. Its object is first to ascertain in what wealth consists, and then to explain the causes of its production, and the principles on which it is distributed.

EFFERVESCENCE, in chemistry, is a rapid disengagement of gas taking place within a liquid ; in consequence of this numerous bubbles rise to the surface, forming a head of froth, and bursting with a hissing noise.

EFFLUVIUM, a term used to express the minute particles which exhale from most, if not all, terrestrial bodies in the form of insensible vapours.

Egg, a body containing an embryo, or germ of an animal, under a cortical surface, or shell. The exterior part of an egg is the shell, a thin, earthy,

and brittle cortex, including all the other parts. The shell becomes more brittle by being exposed to a dry heat. It is lined every where with a very thin but pretty tough membrane, which dividing at, or very near, the obtuse end of the egg, forms a small bag, where only air is contained. In new-laid eggs this follicle appears very little, but becomes larger when the egg is kept. Within this are contained the albumen, or white, and the vitellus, or yolk; each of which have their different virtues. See *Albumen* and *Vitellus*. The animal in the egg is first nourished by the albumen; and, when this is consumed, by the vitellus, as with milk.

EGYPT, a country of Africa, bounded on the north by the Mediterranean, on the east by the Red Sea, and the Isthmus of Suez, on the south by mountains, which separate it from Nubia, and on the west by the deserts of Lybia. It is reckoned about 500 miles long and 100 broad, and is divided into Upper and Lower Egypt, the former extending in a long narrow valley from Syene to Grand Cairo. Two ridges of mountains form the outlines of Upper Egypt, running along each side of the Nile, till, reaching Grand Cairo, the western ridge takes its course towards Alexandria, the other towards the Red Sea. Lower Egypt includes all the country between Cairo and the Mediterranean on the north and south; and Lybia and the Isthmus of Suez to the west and east, bounded by sandy deserts; it contains slips of land fertile and well cultivated on the borders of the rivers and canals, and, in the centre, that tract of land which is called the Delta, formed by the branches of the Nile.

By some geographers, Egypt is divided into three parts, Upper, Middle and Lower: the Upper was called Thebais, now Said: Middle Egypt, now called Vostani, and Lower Egypt, the best part of which was the Delta, now called Bahira. The Thebais took its name from Thebes, the capital, and once contained many more cities; the other parts of Egypt contained a great number of magnificent and populous cities. Egypt is famed for its great fertility, which is ascribed to the overflowing of the Nile. This river begins to rise when the sun is vertical in Ethiopia, and the annual rain falls there from the middle of May to September, or even October. At the height of its flood in the Lower Egypt, nothing is to be seen in the plains but the tops of forests and fruit-trees, their towns and villages being built upon eminences, either natural or artificial.

EGYPTIANS, see *Gypsies*.

ELASTICITY, or *elastic force*, that property of bodies whereby they restore themselves to their former figure, after any external pressure; being the same with what is otherwise called springiness, very observable in a bent bow, steel springs, and the like. A perfectly elastic body, is that which restores itself with the same force wherewith it was bent, or depressed; those which do not restore themselves with exactly the same force, being called imperfectly elastic bodies. Philosophers account for elasticity from the principles of the attraction and repulsion of bodies: thus, if a steel spring, wire, or piece of very thin glass, be bent out of its natural position, the particles on the convex part are forced from the intimate union they had before;

and, on the concave part, they are forced nearer together, or harder upon each other, than in the natural state: in both which cases, there will be a considerable resistance to overcome, and consequently require a superior force. During this state of the particles, they may be said to be under a sort of tension on one side, and compression on the other: and, since by this force they are not drawn out of each other's attraction, as soon as the force is remitted or ceases to act, the attractive power reduces the particles, and unbends the wire. Now it is well known, that many substances are composed of such fibrous parts or filaments which resemble fine wires, and are interwoven and disposed in such a manner, as in sponge, for instance, that they cannot be compressed without being bent or wrested from their natural position; whence all such bodies will, in such cases, exert a spring or force to restore themselves, in the same manner that the bent wire did. All known bodies are in some degree or other elastic, but none of them perfectly so; such are most metals, semi-metals, stones, and animal and vegetable substances, however they may differ in degree. Elasticity seems to vary, according to the different densities of bodies; for the more metals are hammered, the more elastic they become.

... ELDER, or *seniors*, in Jewish history, were persons the most considerable for age, experience, and wisdom. Of this sort were the seventy men whom Moses associated to himself in the government of his people; such, likewise, afterwards, were those who held the first rank in the synagogue, as presidents. In the first assemblies of the primitive

Christians, those who held the first place, were called elders. The word **presbyter**, often used in the New-Testament, is of the same signification : hence the first councils of the Christians were called **presbyteria**, or councils of elders.

ELDER is also a denomination still preserved in the presbyterian discipline. They are officers who, with the ministers and deacons, compose the sessions of the kirk. The elder's office is to assist the minister in visiting the congregation upon occasion, to watch over the morals of the people of his district; and to give them private reproof in case of any disorder ; but if the scandal be gross, or the person obstinate, to lay the thing before the session. The elders are chosen from among the most substantial, intelligent, and regular people, by the session or consistory of the kirk.

ELECT, in matters of polity, is applied to archbishops, and other ecclesiastic officers, who are chosen, but not yet consecrated ; as also to secular officers before they are invested with their office or jurisdiction : thus the emperor is said to be elect, before he is inaugurated ; and the lord mayor of London, before his predecessor's mayoralty is expired.

ELECTOR, a person who has a right to elect or choose another to an office, honour, &c. Elector is particularly, and by way of eminence, applied to those princes of Germany in whom lies the right of electing the emperor ; being all sovereign princes, and the principal members of the empire. In 1356, Charles IV, by the golden bull, fixed the number of electors to seven ; three ecclesiastics, *viz.* the archbishops of Mentz, Treves, and Cologne ; and four

seculars, viz. the king of Bohemia, count Palatine of the Rhine, duke of Saxony, and marquis of Brandenburg. In 1648, this order was changed, the duke of Bavaria being put in the place of the count Palatine, who, having accepted the crown of Bohemia, was outlawed by the emperor; but being at length restored, an eighth electorate was created for the duke of Bavaria. In 1692, a ninth electorate was created, by the emperor Leopold, in favour of the duke of Hanover, of the house of Brunswick-Lunenbourg.

ELECTRICITY, the operation of a fluid, extremely subtile and in general invisible; but which is sometimes the object of the senses, and discovers itself to be one of the principal agents in nature.

The name is derived from *electrum*, amber, a substance the attractive power of which was observed at least six hundred years before the Christian era: electricity, however, scarcely became a distinct object in science before the commencement of the seventeenth century, when a book, containing accounts of several electrical experiments, was written by Dr. William Gilbert; and it is only since the year 1745, when the *Leyden* phial was discovered, that it has advanced with any considerable rapidity. The theory is still a matter of doubt and controversy, or rather, one concerning which no one presumes to speak decidedly: to describe electricity, therefore, it is necessary to relate a vast variety of facts: an undertaking too voluminous for this work, wherein it shall only be attempted to prepare the reader for whatever he may meet with on the subject, by defining the technical terms.—Electrics are non-conductors; and con-

ductors non-electrics. An electrician divides all substances into two classes : 1. *Non-conductors*, or those electrical by themselves, as glass, amber, sealing-wax, &c. which are sometimes called *electrics per se* ; 2. *Non-electrics*, or those which though incapable of being excited, can yet, in certain circumstances, convey the electric power from one body to another : these are also called *conductors* ; the most perfect of which are metals, charcoal, and water.

The effects of the electric fluid, whether by attraction or repulsion, or by emitting streams, or pencils as they are called, of blue light, are all classed under the general word *electricity* ; and any body to which that power of attraction, repulsion, &c. is communicated, is said to be electrified : if its virtue is inherent in itself, it is said to be excited.

If you take a clean and dry glass tube, and rub it up and down several times with a dry and rather warm piece of flannel, the tube will be excited, and will, if presented to any small light substances, attract and repel them alternately.

If the tube be excited in the dark, and the knuckle be presented to it, a spark will be seen passing between the finger and the tube, accompanied by a snapping noise, and the sensation of pain. The noise and sensation in this experiment, and the attraction and repulsion in the other, are electrical effects.

Electrics, as has been observed, are also called non-conductors ; a name which they have obtained from their power of stopping the communication of the electric virtue from one body to another :

thus, though a *conductor* be properly placed for receiving the virtue from an excited electric, none will pass to it, if any *electric* substance be interposed; or if the *conductor* be terminated by an electric, none will pass beyond the place where the electric substance begins.

Insulation, is a term used when a *conducting* or non-electric substance is placed upon an electric, so that any power communicated to it cannot pass off. Respecting electrics and non-electrics, it is however necessary to observe that the definitions must be understood with some degree of limitation; for there is no substance either a perfect electric, or a perfect conductor: the most complete conductors making, when they are of great length, a sensible resistance to the passage of the fluid through them; and the most complete electrics being in some degree conductors.

Electricity is found to be of two kinds, *negative* and *positive*; but in what the difference consists is not ascertained. These two electricities are sometimes called the *vitreous* and *resinous*; the former usually belonging to glass, and the latter to amber, gum, and similar substances.

If a small pith ball, suspended on a silken thread, be brought near the tube when excited, the tube will attract the ball, and the ball will become positively electrified, that is, will have more than its natural share: if another ball be treated in the same way, and then the two brought together they will repel one another.

If a roll of sealing wax or other resinous substance be excited, and a pith ball be brought near it, the ball will be attracted: and if another b.

placed in the same situation, and then the two made to approach, they will repel one another.

But if a ball that has been excited by the glass be brought near one that has been excited by the wax, they will then attract each other. These experiments prove that bodies similarly electrified repel each other, and that bodies dissimilarly electrified attract each other.

To explain these facts, it is supposed that the glass tube by being excited possesses more than its natural share of the electric fluid, part of which it gives to the ball brought near it, and that the wax by excitation parts with some of its electricity and has less than its natural share, and of course takes away a part of that contained in the ball placed near it. When therefore these balls are brought together they attract one another to restore the equilibrium: that is, the one positively electrified gives out its superabundance to that which is negatively electrified, or which has less than its natural portion.

Some are of opinion that the electric fluid is the matter of light; and its influence is observed in all the departments of nature.

Machines have been contrived for rubbing electrics and conductors together; and for collecting the electric fluid from surrounding bodies: these are called Electrical Machines, of which there are various kinds. The following description refers to one of the most common and most useful. See Plate ELECTRICITY, Fig. 1. LM is a glass cylinder turned by the handle B against a rubber, to which is attached a piece of silk D. By the friction of the glass against the rubber, the electricity is collected

and carried to the conductor E. The rubber is fastened to a glass pillar, G, and the conductor E stands likewise on glass, the cylinder L M is also insulated, therefore before the machine can be worked with effect, a chain must be hung on the rubber to communicate with the table, and by means of the table with the earth. By this chain the electricity is collected, for the rubber having parted with all it has, is supplied from the ground.

If an ostrich's feather be placed in the hole *x* of the conductor E, and the machine worked, the parts of the feather will endeavour to avoid each other, and stand erect, because the several filaments being electrified with the same electricity repel each other. The electrical bells, fig. 2, shew the manner in which electricity is communicated. The two outer bells *z z* are suspended on chains, the middle one is insulated or hung on a silken thread: the two small brass balls *a a* are likewise insulated. If the apparatus be hung on the conductor E, and the machine worked, the bells *z z* will become electrified or have more than their natural share of electricity, and will attract the balls *a a*, which will receive from the bells a part of their superabundant electricity, and will carry it to the bell *x*; this by means of the chain conveys it to the earth, the great repository of electricity: hence, so long as the machine is worked the bells will keep ringing. If an apparatus of this kind be connected with a conductor on the outside of a building, it will serve to give notice of the approach and passage of any strongly electrified cloud.

Electricity may be communicated to the whole surface of any glass, or to any given part of it,

if that part be covered with a metallic surface, as tinfoil. This is called coating the glass. A glass jar, fig. 3, coated about three fourths over, leaving the upper rim two or three inches deep quite free from coating, is called a Leyden-jar, so named from the town at which it was first made. If the knob *x* be brought near the conductor *E* while the machine is working, it will be charged, provided the jar is held in the hand, or stands on a table, &c. which communicates with the earth, because the inside will receive from the conductor more than its natural share, but, as no body can contain in the whole, more than a certain quantity, it will throw off as much from the outside as it receives superabundant inside, of course the two sides of the jar will be in different states of electricity, the inside *plus*, and the outside *minus*, and the glass rim being a non-conductor, the electric fluid cannot of itself pass from the inside to the outside, but if the discharging rod, fig. 4, be brought to the jar, so that the knob *x* shall touch the outside coating, and the knob *z* touch the wire that communicates with the inside of the jar, then, in an instant, the extra fluid of the inside, will pass through the wire *z m x* to the outside, and the equilibrium will be restored. If instead of the discharging rod, a person touch the outside coating with one hand, and bring the knuckle of a finger of the other hand to the wire *x*, which communicates with the inside, his body becomes the discharger, and he will feel a shock, which will be more or less severe, as the phial is more or less charged. Any number of persons may receive the shock if they all hold hands, and the person at one extremity touch the outside of the

jar while the person at the other extremity touch the wire x of the jar.

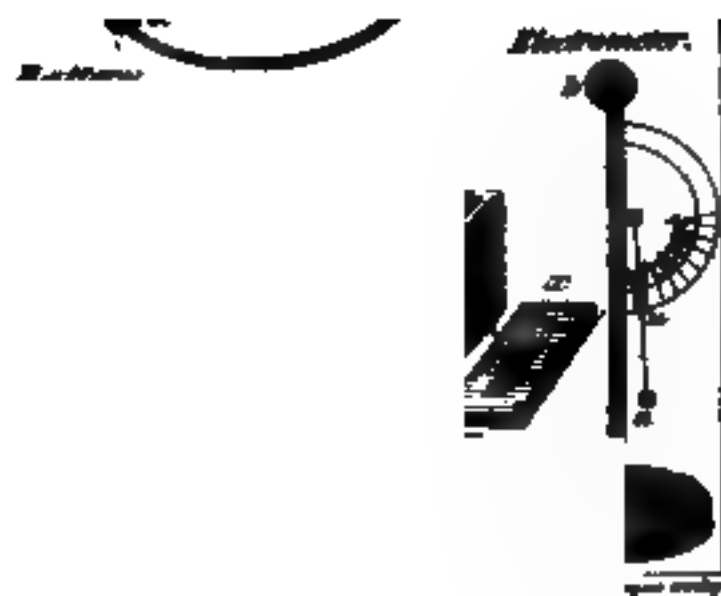
Several Leyden jars connected together, Fig. 5, by making a communication between all the outsides, and another between all the insides, form an electrical battery. By means of this, if gunpowder, gold leaf, or any other inflammable substance be laid on the glass plate xx , and an electrical charge be sent through them, they will instantly take fire. Slender wire may be made red hot, and small animals killed with the electrical battery.

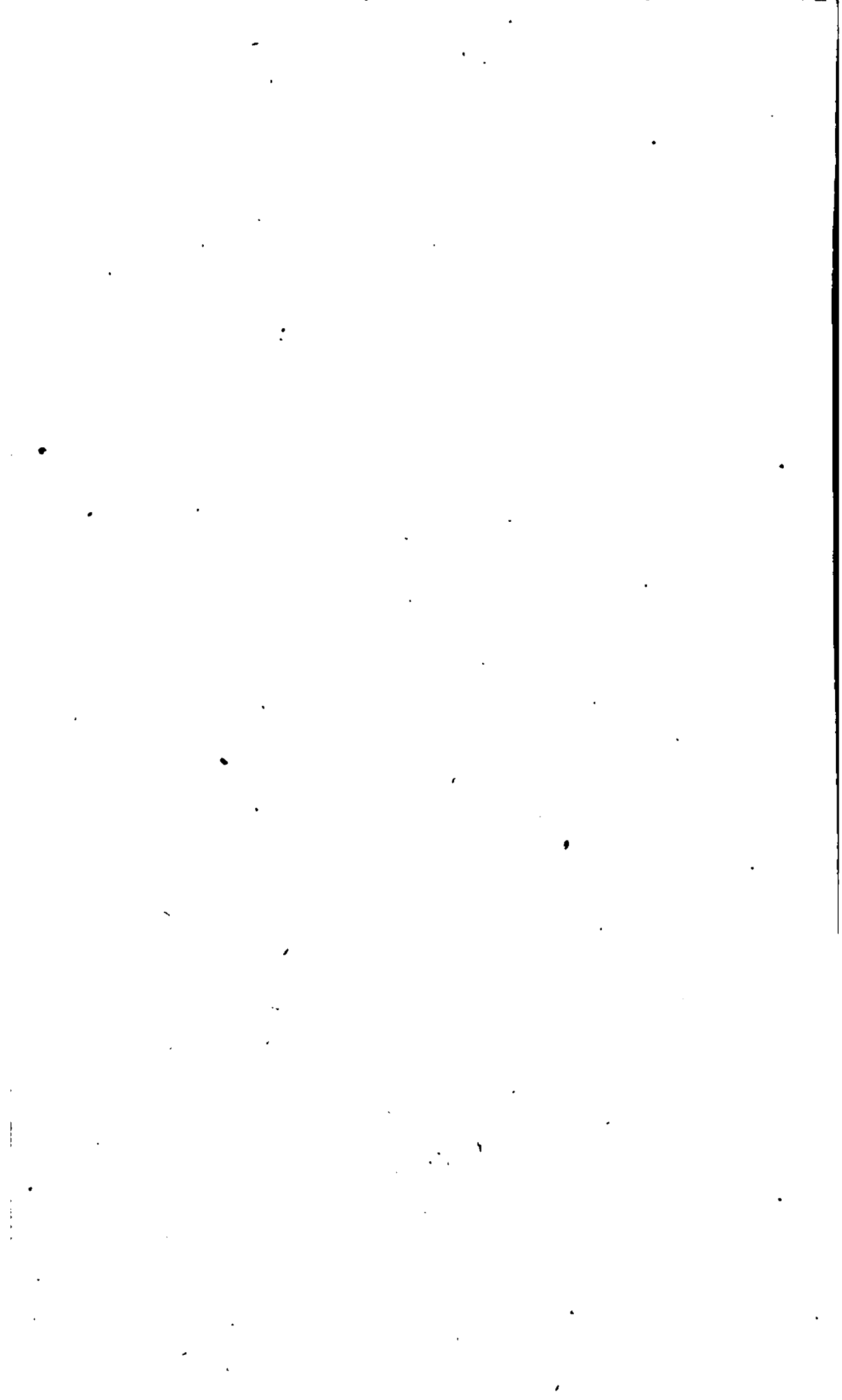
Fig. 6. is an electrometer intended to measure the degree to which any jar, or battery is charged, for if the wire a be unscrewed from the stand, and be fixed at x on the conductor, or x of the Leyden-jar, or at F in the battery, when they are charged or charging, then in proportion to the quantity of electricity thrown in, the index u will make a smaller or greater angle with the pillar ba .

It is now ascertained that lightning and electricity are the same; that is, lightning is the rapid motion of vast masses of the electric matter, and thunder is the noise produced by the motion of lightning. Metallic points silently attract electricity from the bodies charged with it, hence the use of pointed conductors to secure buildings from the effects of lightning. The Auroræ Boreales, or northern lights, are the effects of the electric fluid passing through highly rarefied air.

Earthquakes, whirlwinds, and water-spouts are generally accompanied with, and dependant upon electrical phenomena. There are three kinds of fish that possess the power of giving the electrical shock similar to that which is experienced from the Ley-







bility of the elephant. A band of music went to play in a gallery surrounding the upper part of the stalls in which were kept two elephants, distinguished by the names of *Margaret* and *Hans*. Dead silence was procured: some provisions of which they were very fond were given to engage their attention; and the musicians began to play. It no sooner struck the ears of the two elephants, than they ceased from eating, and turned, in surprise, to observe whence the sounds proceeded. At sight of the gallery, the orchestra, and the assembled spectators, they discovered a considerable alarm, as if they imagined that there was some design against their safety: but the music soon overpowered their fears; and all other emotions were completely absorbed in their attention to it. Music of a bold and wild expression excited them to turbulent agitations, expressive either of violent joy, or of rising fury. A soft air performed on the bassoon evidently soothed them to gentle and tender emotions. A gay and lively air moved them—especially the female—to demonstrations of highly sportive sensibility. Other variations of music produced corresponding changes in the emotions of the elephants. See Pl. Nat. Hist. fig. 14.

ELEPHANT, Knights of the, an order of knighthood in Denmark. It is also called the order of St. Mary. Its institution is said to have been owing to a gentleman among the Danish croisées having killed an elephant, in an expedition against the Saracens, in 1184, in memory of which king Canutus instituted this order, the badge of which is a towered elephant, with an image of the holy

virgin encircled with rays, and suspended by a watered sky-coloured ribbon.

ELL, a measure of length, different in different countries ; but those mostly used in England, are the English and Flemish ells ; the former, three feet nine inches, or one yard and a quarter ; and the latter only twenty-seven inches, or three-quarters of a yard. In Scotland, the ell contains 37 $\frac{2}{10}$ ths English inches.

ELLIPSIS, in rhetoric, a figure nearly allied to preterition, when the orator, through transport of passion, passes over many things : which, had he been cool, ought to have been mentioned. In preterition, the omission is designed ; which in the ellipsis, is owing to the vehemence of the speaker's passion, and his tongue not being able to keep pace with the emotion of his mind.

ELM, in Botany, a tree of the first magnitude, the wood of which is very serviceable where it may lie continually dry or wet, in extremes. Accordingly, it is proper for water-works, mills, pumps, aqueducts, and ship-planks beneath the water-lines. It is also of use for wheel-wrights, handles for single saws, axletrees, and the like. The clearness of the grain makes it also fit for all kinds of carved works, and most ornaments relating to architecture.

ELOCUTION, in rhetoric, the adaptation of words and sentences to the things or sentiments to be expressed. It consists of elegance, composition, and dignity : the first comprehends the purity and perspicuity of a language, and is the foundation of elocution ; the second ranges the words in proper

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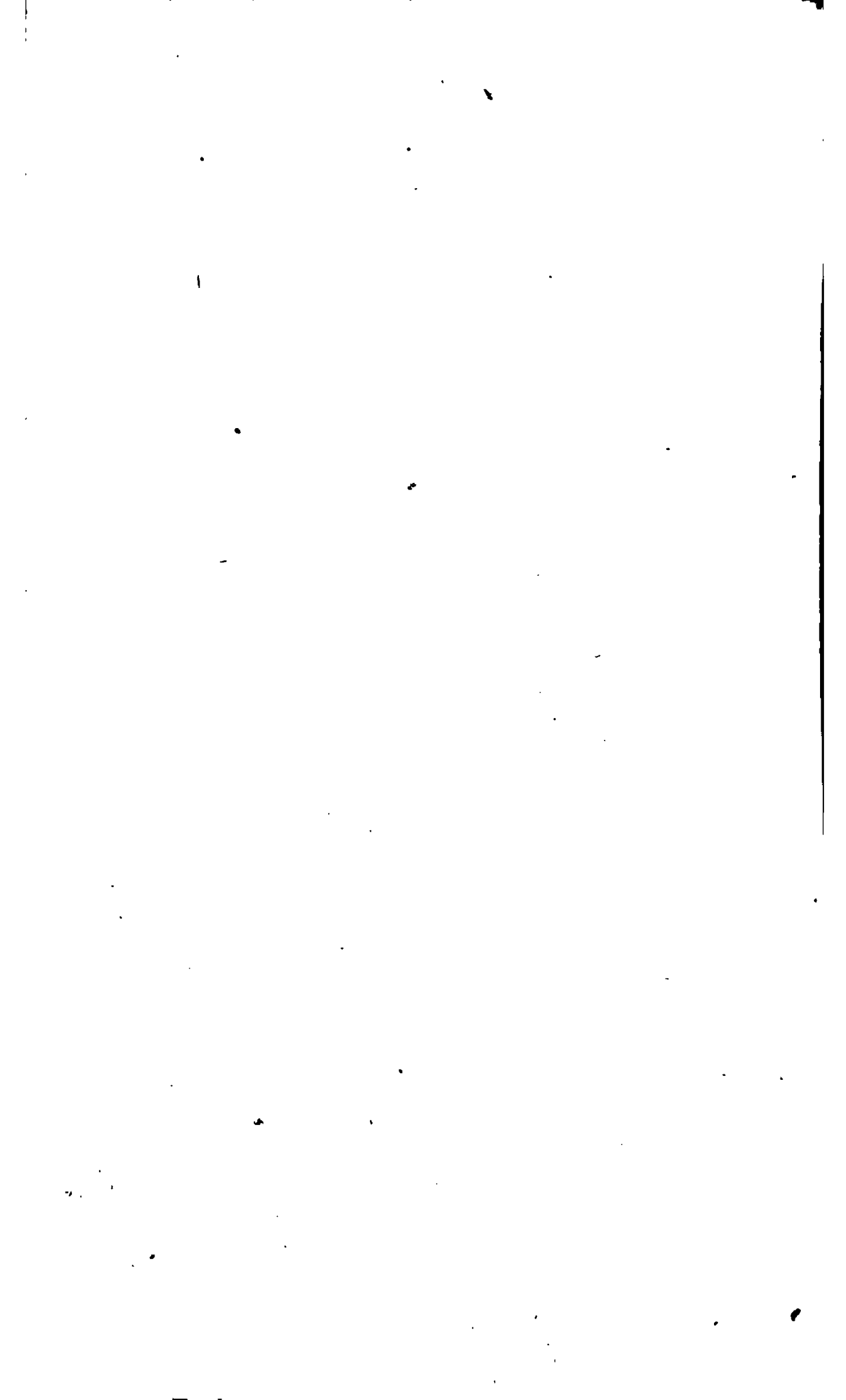
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the fortieth is the fact that the

Fig. 13. *Dipus, saculus* common-Jarboa.Fig. 14. *Draco volans* flying Dragon.Fig. 15. *Elephas maximus* Elephant.Published by J. Harris & Sons 17th St.

Cooper Inst.



order; and the last adds the ornaments of tropes and figures to give strength and dignity to the whole.

ELOGY, a praise or panegyric bestowed upon a person or thing, on account of its merit. Two admirable rules of criticism are furnished upon this subject: 1. The beauty of elogy consists in expressive brevity, and therefore is injured by the presence of two synonymous words; 2. Elogies should not contain a single epithet, but praise by a simple and true relation of facts.

ELONGATION, in astronomy, the digression or recess of a planet from the sun, with respect to an eye placed on our earth. The term is chiefly used in speaking of Venus and Mercury, the arch of a great circle intercepted between either of these planets and the sun, being called the elongation of that planet from the sun.

But here it is to be observed that it is only a circle which has the sun for its centre; that the greatest elongation is in a line touching the planet's orbit. For in an elliptic orbit it may be, that the elongation from the sun may grow still greater, even after it has left the place where the line joining the earth and planet touches the orbit. For after that, the true distance of the planet from the sun may increase, whilst the distance of the sun and planet from the earth does not encrease, but rather decrease. But, because the orbits of the planets are nearly circular, such small differences may be neglected in astronomy. The greatest elongation of Venus is found by observation to be about forty-eight degrees, and the greatest elongation of Mercury about twenty-eight degrees, upon which account

this planet is rarely to be seen with the naked eye.

ELONGATION, angle of, is an angle contained under lines drawn from the centre of the sun and planet to the centre of the earth.

ELOQUENCE, the art of speaking well, so as to affect and persuade. Cicero defines it, the art of speaking with copiousness and embellishment. Eloquence and rhetoric differ from each other, as the theory from the practice: rhetoric being the art which describes the rules of eloquence, and eloquence that art which uses them to advantage.

ELYSIUM, or *Elysian Fields*, in heathen theology, plains abounding with woods, fountains, verdure and every delightful object; supposed to be the habitation of heroes and good men, after death.

EMBALMING, is the opening a dead body, taking out the intestines, and filling the place with odoriferous and desiccative drugs and spices to prevent its putrifying. The Egyptians have always been celebrated for their adherence to this practice, and the skill with which they performed it. With some variation, it is still one of the peculiar customs of that nation. It appears to have been a metaphysical notion, inculcated as of their religion, that the soul continued with the body. There naturally followed an affectionate desire to do every thing that living creatures can suppose acceptable to the dead. They were even desirous of having the dead bodies of their parents in their houses, and at their tables, and believed, as has been suggested, that their souls were present also; and it was essential to this gratification that those bodies should be preserved in the most perfect manner possible.

EMBARGO, in commerce, an arrest on ships, or

merchandize, by public authority ; or a prohibition of state, commonly on foreign ships, in time of war, to prevent their going out of port ; sometimes to prevent their coming in ; and sometimes both, for a limited time. **Embargo** differs from *quarantine*, insomuch as this last is always for the term of forty days, in which persons from foreign parts infected with the plague, are not permitted to come on shore.

↳ **EMBASSADOR**, See **AMBASSADOR**.

EMBER-WEEKS, or *days*, in the Christian Church are certain seasons of the year set apart for the imploring God's blessing, by prayer and fasting, upon the *ordinations* performed in the church at such times.

EMBLEM, a kind of painted enigma, or certain figures painted or cut metaphorically, expressing some action. Thus *friendship* has been represented under the beautiful emblem of a *girl*, one of whose arms encircles a leafless tree : and the olive was an emblem of *peace* ; so esteemed, probably, because it belonged to the labours of the husbandman, and the productions of the earth constitute that *plenty* which is an attendant on peace.

EMBOSSING, in architecture and sculpture, the forming or fashioning works in *relievo*, whether cut with a chissel, or otherwise. **Embossing** is a kind of sculpture, wherein the figures project from the plane whereon it is cut ; and according as the figures are more or less prominent, they are said to be in *alto*, *mezzo*, or *basso relievo* ; or high, mean or low relief.

EMBROIDERY, a work in gold, or silver, or silk-thread, wrought by the needle upon cloth, stuffs, or

Embossed, into various figures. There are several kinds of embroidery; as, 1. Embroidery on the stamp, where the figures are raised and rounded, having cotton or parchment put under them to support them. 2. Low embroidery, where the gold and silver lie low upon the sketch; and are stitched with silk of the same colour. 3. Gimped-embroidery; this is performed either in gold or silver; they first make a sketch upon the cloth, then put on cut vellum, and afterwards sew on the gold and silver with silk-thread: in this kind of embroidery they often put gold and silver cord, tinsel, and spangles. 4. Embroidery on both sides; that which appears on both sides of the stuff. 5. Plain embroidery, where the figures are flat and even, without cords, spangles, or other ornaments.

EMERALD, in natural history, a genus of precious stones, of a green colour, and next in hardness to the ruby. The genuine emerald, in its most perfect state, is, perhaps, the most beautiful of all the gems: it is found of various sizes, but usually small; a great number of them are met with of about the sixteenth part of an inch in diameter, and they are found from this to the size of a walnut. The oriental emeralds are found in the kingdom of Cambay. The American, principally about Peru; and the European, chiefly in Silesia.

EMERSION, in astronomy, is when any planet that is eclipsed begins to emerge or get out of the shadow of the eclipsing body. It is also used when a star, before hidden by the sun as being too near him, begins to re-appear or emerge out of his rays.

EMERY, in natural history, a rich iron-ore found in large masses of no determinate shape, or size,

extremely hard and very heavy. It is usually of a dusky brownish-red on the surface, but when broken, is of a fine, bright, iron-grey, but not without some tinge of redness, and is spangled all over with shining specks, which are small flakes of a foliaceous talc, highly impregnated with iron. It is also sometimes very red, and then usually contains veins of gold. Emery is prepared by grinding in mills, and the powder is separated into parcels of different degrees of fineness by washing; these are called the first, second, and third sort; the first being that which remains longest suspended in water; the others, such as sink sooner from the same liquor, and from which it is poured, while yet turbid, to settle for the finer kind. These several sorts are of great use to various artificers in polishing and burnishing iron and steel works, marble cutting and scolloping glass, &c. The lapidaries cut the ordinary gems on their wheels, by sprinkling the wetted powder over them, the wheels they use being usually of lead, with a small admixture of pewter, that their softness may admit the emery better. It will not cut diamonds.

EMIR, a title of dignity among the Turks, signifying a prince. This title was first given to the caliphs, but when they assumed the title of Sultans, that of Emir remained to their children, as that of Caesar among the Romans. At length the title became attributed to all who were judged to descend from Mahomet by his daughter Fatimah, and who wear the green turban instead of the white. The Turks make an observation, that the emirs, before their fortieth year, are men of the greatest gravity, learning, and wisdom: but after this, if they are

not great fools; they discover some signs of sense and stupidity. This is interpreted by wise Turks as a sort of divine impulse, in token of their birth and sanctity. The Turks also call the viziers, bashaws, or governors of provinces, by this name; which is said to be the root of the English word *admiral*.

EMPEROR, a title of honour among the ancient Romans, conferred on a general who had been victorious, and now made to signify a sovereign prince, or supreme ruler of an empire: it signifies a commander.

EMPIRE, a government; or the territory over which a government prevails; or the government or territory of an emperor.

ENAMEL, a kind of coloured glass, used in enamelling and painting in enamel. Enamels have for their basis a pure crystal-glass or frit, ground up with a fine calx of lead and tin prepared for the purpose, with the addition usually of white salt of tartar. These ingredients baked together, are the matter of all enamels, which are made by adding colours of this or that kind in powder to this matter, and melting or incorporating them together in a furnace. Enamels are used either in counterfeiting or imitating precious stones, in painting in enamel, or by enamellers, jewellers, and goldsmiths, in gold, silver, and other metals.

ENAMEL, painting in; is performed on plates of gold or silver, and most commonly of copper, enamelled with the white enamel: the colours are melted in the fire, where they take a brightness and lustre like that of glass. This painting is prized for its peculiar brightness and vivacity, which is very permanent; the force of its colours not being

effaced or rubbed by time, as in other painting, and continuing always as fresh as when it came out of the workman's hands: it is usually in miniature, being the more difficult the larger it is, by reason of certain accidents to which it is liable in the operation. When the colours are all laid, the painting is gently dried over a slow fire to evaporate the oil, and the colours afterwards melted to incorporate them with the enamel, making the plate red hot in a fire. Afterward, that part of the painting is passed over again which the fire has in any degree effaced, strengthening the shades and colours, and committing it again to the fire, observing the same method as before, which is repeated till the work is finished.

ENCHASING, or CHASING, the art of enriching and beautifying gold, silver, and other metal-work, by some design represented thereon, in low relievo. It is performed by punching or driving out the metal, to form the figure, from within side, so as to stand out prominent from the plane or surface of the metal. For his purpose, a number of fine steel-blocks, or puncheons, of divers sizes, are provided; and the design being drawn on the surface of the metal, they apply the inside upon the heads and tops of these blocks, directly under the lines or parts of the figures; then, with a fine hammer, striking on the metal, sustained by the block, the metal yields, and the block makes an indenture, or cavity, on the inside, corresponding to which there is a prominence on the outside, which is to stand for that part of the figure.

ENFILADE, in the art of war, is used in speaking of trenches or other places, which may be scoured

by the enemy's shot, along their whole length. In conducting the approaches at a siege, care must be taken that the trenches be not enfiladed from any work of the place.

ENGINE, in mechanics, a compound machine, made of one or more mechanical powers, in order to raise, cast, or sustain any weight, or produce any effect which could not be easily effected otherwise. Engines are extremely numerous; some used in war, as the battering ram, ballista, wag-gons, chariots, &c. others in trade and manufactures, as cranes, mills, presses, &c. others to measure time, as clocks, watches, &c. and others for the illustration of some branch of science, as the orrery, cometarium, and the like. In general, it may be observed, concerning engines, that they consist of one, two, or more of the simple powers variously combined together; that in most of them the axis in peritrochio, the lever, and the screw are the constituent parts; that in all, a certain power is applied to produce an effect of much greater moment; and that the greatest effect, or perfection, is when it is set to work with four ninths of that charge which is equivalent to the power, or will but just keep the machine in equilibrio.

ENGINE, Steam. See **STEAM**.

ENGINEER, in the military art, one who, by a perfect knowledge in mathematics, delineates upon paper, or marks upon the ground, all sorts of forts, and other works proper for offence and defence. He should understand the art of fortification, so as to be able, not only to discover the defects of a place but to find a remedy proper for them, as also

how to attack as well as to defend. When, at a siege, the engineers have surveyed the place, they are to make their report to the general, acquainting him which part they judge the weakest, and where approaches may be made with most success. Their business is also to delineate the lines of circumvallation and contravallation, taking all the advantages of the ground ; to mark out the trenches, places of arms, batteries, and lodgments, taking care that none of their works be flanked or discovered from the place.

ENGLAND, the southern division of Great Britain, situated in the Atlantic Ocean, between 2° east and 6° west longitude, and between $49^{\circ} 55'$ and $55^{\circ} 55'$ north latitude. There are in England, including Wales, fifty-two counties, two archbishoprics, twenty-four bishoprics, two universities, twenty-five cities, upwards of eight hundred towns, and near ten thousand parishes. In civil and political affairs, England is divided into forty counties ; in the administration of law and justice, into six circuits ; and in church government, into two provinces. Each county has its lord-lieutenant and its sheriff, and is subdivided into hundreds. For each circuit two judges are from time to time appointed, who visit it in the spring and autumn. In holding the lent, or spring, assizes, the northern circuit extends only to York and Lancaster ; the assizes at Durham, Newcastle, Carlisle, and Appleby being held only in the autumn, when it is distinguished by the name of the *long circuit*. The following is a list of the *circuits*, which includes also the names of the counties :

1. "Home circuit," Essex, Hertford, Kent, Surry, and Sussex.

2. "Norfolk circuit," Bucks, Bedford, Huntingdon, Cambridge, Suffolk, and Norfolk.

3. "Oxford circuit," Oxford, Berks, Gloucester, Worcester, Monmouth, Hereford, Salop, and Stafford.

4. "Midland circuit," Warwick, Leicester, Derby, Nottingham, Lincoln, Rutland, and Northampton.

5. "Western circuit," Hants, Wilts, Dorset, Somerset, Devon, and Cornwall.

6. "Northern circuit," York, Durham, Northumberland, Lancaster, Westmoreland, and Cumberland.

Middlesex and Cheshire are not comprehended in the above circuits; the former being the seat of the supreme courts of justice, and the latter a county-palatine. There are still distinct courts of chancery in Lancaster and Durham, with chancellors; and there is a court of exchequer at Chester, of a mixed kind, both for law and equity, of which the chamberlain of Chester is judge: there are also other justices in the counties palatine, to determine civil actions, and pleas of the crown.

ENGLAND, *Church of*, also called the reformed religion (with reference to that of Rome), a system of Christianity founded upon the doctrines of Luther. Its dogmas are set forth in *thirty-nine articles*, commonly known by that name. Its government is episcopal, that is, exercised by bishops, who are, in effect, appointed by the crown, the king being, very properly, the head of the church.

The power of making laws in the church belongs to the convocation.

ENGRAVING, the art of cutting metals and precious stones, and representing designs thereon. Engraving, properly a branch of sculpture, is divided into several other branches, according to the matter whereon it is employed, and the manner in which it is performed. The original way of engraving on wood is at present denominated cutting in wood; that on metals with aquafortis, is named etching; that by the knife, burnisher, punch, and scraper, is called mezzotint; that on stones for inscriptions, stone-cutting; and that performed with the graver, on metals or precious stones, keeps the primitive name of engraving.

Engraving on copper is performed with the graver on a plate which, being well polished, is covered over thinly with virgin-wax, and then smoothed, while warm, with a feather, so that the wax be of an equal thickness on the plate; and on this the draught or design, done in black lead, red chalk, or ungummed ink, is laid with the face of the drawing on the wax; then they rub the reverse side, which causes the whole design of the drawing to appear on the wax. The design, thus transferred, is traced through on the copper, with a point, or needle; then heating the plate, and taking off the wax, the strokes remain to be followed with the graver. In the conduct of the graver consists almost all the art, which depends not so much upon rules as upon practice, and the habitude, disposition, and genius of the artist, the principles of engraving being the same with those of painting; for if an engraver be not a master of design, he can

never arrive at any degree of perfection in the art. The instruments necessary for this sort of engraving are, besides a graver, a cushion (or sand bag, made of leather, to lay the plate on, in order to give it the necessary turns and motions); a burnisher, made of iron or steel, round at one end, and usually flattish at the other, to rub out slips and failures, soften the strokes, &c. a scraper, to pare off the surface, on occasion; and a rubber, to fill up the strokes that they may appear the more visible.

In engraving on precious stones, use is made of either the diamond or of the emery. The diamond, which is the hardest of all stones, is only cut by itself, or with its own matter.

ENGRAVING on steel is chiefly employed in cutting seals, punches, matrices, and dyes proper for striking coins, medals, and counters. Engravers in steel commonly begin with punches, which are in relief, and serve for making the creux, or cavities, of the matrices, and dyes: though sometimes they begin with the creux, or hollowness, but then it is only when the intended work is to be cut very shallow. The first thing done, is that of designing the figures; the next is the moulding them in wax, of the size and depth they are to lie, and from this wax the punch is engraven. When the punch is finished they give it a very high temper, that it may the better bear the blows of the hammer with which it is struck to give the impression to the matrix. The steel is made hot to soften it, that it may the more readily take the impression of the punch; and after striking the punch on it, in this state, they proceed to touch up or finish the strokes

and lines, where, by reason of their fineness, or the too great relieve, they are any thing defective, with steel graters of different kinds, chisels, &c. being the principal instruments used in graving on steel.

ENIGMA. See **ANIGMA**.

ENNEANDRIA, the name of the ninth class in Linnaeus's sexual system, consisting of plants which have hermaphrodite flowers, with nine stamens or male organs. The orders, or secondary divisions, in this class are three, being founded on the number of the style, seed-buds, or female organs. Laurustinae, and cassytha, have one style; rhubarb (rheum), has a triple stigma or summit, but scarce any style; flowering rush has six styles. The genera just enumerated are all that belong to the class **Enneandria**. The first genus, laurus, is very extensive; comprehending the bay-tree, cinnamon-tree, camphor-tree, benjamin-tree, sassafras-tree, and the avocado or alligator pear.

Ensign, in the military art, a banner under which the soldiers are ranged according to the different companies or parties. The European ensigns are pieces of taffety with various figures, arms, and devices painted on them, in different colours: the Turkish ensigns are horses tails.

Ensign is also the officer that carries the colours, being the lowest commissioned officer in a company of foot, subordinate to the captain and lieutenant. It is a very honourable post. An ensign is to carry the colours in assault, battle, &c. and, should not quit them but with his life; he is always to bear them himself on his left shoulder: on a march he may have them carried by a soldier. If the ensign

is killed, the captain is to carry the colours in his stead.

ENTOMOLOGY, the science of insects, a branch of zöology.

Every animal, properly classed among insects, has a head, antennæ, and six or more feet.

The class of insects is divided by Linnaeus into seven orders :

1. "Coleoptera" (from *κοιλα* "a sheath," and *πτερον* "a wing") such insects as have crustaceous *elytra*, or shells, which shut together, and form a longitudinal suture down the back of the insect ; as the beetle.

2. "Hemiptera" (from *ημισ* "half," and *πτερον*), usually have their upper wings half crustaceous, and half membranaceous, not divided by a longitudinal suture, but incumbent on each other ; as the cimeter, or bug.

3. "Lepidoptera" (from *λεπτε* "a scale," and *πτερον*), have four wings, covered with fine scales, in the form of powder or meal ; as the butterfly.

4. "Neuroptera" (from *νευρον* "a nerve," and *πτερον*), have four membranous, transparent, naked wings, generally resembling net-work ; as in the *panorpaea*.

5. "Hymenoptera" (from *υμεν* "a membrane," and *πτερον*), have four membranous wings ; and a sting.

6. "Diptera" (from *δυο* "two," and *πτερον*), have two wings, and *poisers* ; as in the fly.

7. "Aptera" (from *α* "without," and *πτερον*), have no wings. This last division contains scorpions, spiders, crabs, lobsters, &c.

The general characters by which insects are distinguished are the following: they are furnished with several, six or more, feet; the muscles are affixed to the internal surface of the skin, which is a substance more or less strong, and sometimes very hard and horny; they do not breathe like larger animals, by lungs or gills situated in the upper part of the body; but by a sort of spiracles, distributed in a series or row on each side the whole length of the abdomen; these are supposed to communicate with a continued chain, as it were, of lungs, or something analogous to them, distributed throughout the whole length of the body; the head is furnished with a pair of what are termed antennæ, or horns, which are extremely different in different tribes, and which, by their structure, &c. form a leading character in the institution of the genera into which insects are divided.

Writers on natural history formerly included snails, worms, and the smaller animals, or animalcules, in general, among insects: these are now more properly placed among the tribe vermes, or worm-like animals. Insects have also been denominated bloodless animals, which modern discoveries have shown to be contrary to fact: some of them, as the *cimex lectularius*, have been frequently viewed with the microscope, to exhibit in a striking manner the circulation of the blood. In this insect, with a good glass, the vibrations and contractions of the arteries may be distinctly observed.

Most insects are oviparous; of course, the first state in which insects appear is that of an ovum or egg. This relates to the generality of insects, for there are some examples of viviparous insects, as

in the genera *Aphis*, *Musca*, &c. From the egg is hatched the insect in its second or caterpillar state; this second state has been usually known by the name of *eruca*, but Linnæus has changed it to that of *LARVA*, which see; considering it as a sort of masked form or disguise of the insect in its complete state. The larvæ of insects differ very much from each other, according to the several tribes to which they belong; those of the butterfly and moth tribe (*phalaena*) are generally known by the name of caterpillars; those of the beetle (*scarabeus*), except such as inhabit the water, are of a thick, clumsy form. The larvæ of the locust, or grasshopper, (*gryllus*), do not differ very much in appearance from the complete insect, except being without wings. The larvæ of flies, bees, (*musca*, *apis*), &c. are generally known by the name of maggots, and are of thick short form. Those of water beetles (*dytiscus*) are of highly singular forms, and differ, perhaps, more from that of the complete insect than any others, except those of the butterfly tribe. Some insects undergo no change of shape, but are hatched from the egg complete in all their parts, and they undergo no farther alteration than that of casting their skin from time to time, till they acquire the complete resemblance of the parent animal. In the larvæ state, most insects are peculiarly voracious, as in many of the common caterpillars. In their perfect state some insects, as butterflies, are satisfied with the lightest nutriment, while others devour animal and vegetable substances with a considerable degree of avidity. When the larva is about to change into the chrysalis or pupa state, it ceases to feed, and having

placed itself in some quiet situation, lies still for several hours, and then, by a sort of effort, it divests itself of its external skin, and immediately appears in the different form of a chrysalis or pupa; in this state likewise, the insects of different genera differ almost as much as the larva. In most of the beetle tribe, the larva is furnished with short legs, capable of some degree of motion, though very rarely exerted. In the butterfly tribe it is destitute of legs; but in the locust tribe it differs very little from the perfect insect, except in not having the wings complete. In most of the fly tribe it is perfectly oval, without any apparent motion or distinction of parts. The pupa of the bee is not so shapeless as that of flies, exhibiting the faint appearance of limbs. Those of the dragon-fly (*libellula*) differ most widely from the appearance of the complete insect; from the pupa emerges the insect in its ultimate form, from which it never changes, nor receives any farther increase of growth.

Different naturalists have attempted to arrange insects into families and genera, particularly the celebrated Linnæus, whose arrangement may be thus explained. He has formed them into seven families or orders, composing his sixth class of animals, *Insecta*: he defines an insect, a small animal breathing through pores on its sides, furnished with moveable antennæ and many feet, covered with either a hard crust or a hairy skin. The sexes of insects are commonly two, male and female. Neuters are to be met with among those insects which live in swarms, such as ants, bees, &c.

The majority of insects are observed to be annual,

finishing the whole term of their lives in the space of a year or less, and many do not live half that time: nay, there are some which do not survive many hours; but this latter period is to be understood only of the animals when in their complete or ultimate form, for the larvæ of such as are of this short duration, have, in reality, lived a very long time under water, of which they are natives; and it is observed, that water insects, in general, are of longer duration than land insects. Some few insects, however, in their complete state, are supposed to live a considerable time, as bees for instance; and it is well known that some of the butterfly tribe, though the major part perish before winter, will yet survive that season in a state of torpidity, and again appear and fly abroad in the succeeding spring; spiders are also thought to live a considerable time, and some species of the genus cancer are said to live several years, especially the common lobster, &c. It should be observed, however, that these animals, in the opinion of some modern naturalists, constitute a different tribe of beings from insects properly so called.

ENTRY; Bill of, in commerce, a list of goods shipped, and delivered at the custom-house.

Envoy; a person deputed to negotiate some affair with any foreign prince or state. Those sent from the courts of Britain, Spain, &c. to any petty prince or state, such as the princes of Germany, the republics of Genoa, &c. go in quality of envoys, not ambassadors; and such a character only do those persons bear, who go from any of the principal courts of Europe to another, when the occasion is not very solemn or important. There are

envoys ordinary and extraordinary, as well as ambassadors; they are equally the same under the protection of the law of nations, and enjoy all the privileges of ambassadors, only differing from them in this, that they are not treated with equal ceremony.

EPACT, in chronology, a number arising from the excess of the common solar year above the lunar, whereby the age of the moon may be found out every year. The excess of the solar year above the lunar is eleven days. Or the epact of any year expresses the number of days from the last new moon of the old year, which was the beginning of the present lunar year, to the first of January. The first year of the *cycle of the moon*, the epact is 0, because the lunar year begins with the solar. On the second, the lunar year has begun 11 days before the solar year; therefore the epact is 11. On the third, it has begun twice 11 before the solar year; therefore the epact is 22. On the fourth, it begins three times 11 days sooner than the solar year; the epact would therefore be 33; but thirty days being a synodical month, must, that year, be intercalated; or that year must be reckoned to consist of thirteen synodical months, and there remains three, which is the true epact of the year; and so on to the end of the cycle, adding 11 to the epact of the last year; and always rejecting the 30, gives the epact of the present year.

To find the epact until the year 1900. Subtract 1 from the golden number, and multiplying the remainder by 11; reject the thirties, and the epact is given.

A Table of the Golden Numbers, and their Corresponding Epacts, till the year 1900.

G. N°.	Epact.	G. N°.	Epact.	G. N°.	Epact.	G. N°.	Epact.
1	0	6	25	11	20	16	15
2	11	7	6	12	1	17	26
3	22	8	17	13	12	18	7
4	3	9	28	14	23	19	18
5	14	10	9	15	4		

EPHEMERA, the *day-fly*, in zöology, a genus of flies belonging to the neuroptera order, and so called from their living only one day and a night: they have two gibbous protuberances on the top of the head, resembling eyes: add to this, the tail is furnished with hairs, and the antennæ are short. To this genus belong a variety of species, differing from each other in the length of their lives. Some live several days, others do not take flight till the setting of the sun, and die before it rises again. They are very various also, as to size. Sometimes, says M. de Saint Pierre, the duration of the life of an animal is proportioned to that of the vegetable by which it is nourished: many caterpillars live and die with the leaves on which they feed. There are insects that exist only five hours, and such is the *ephemera*. This kind of fly, which is about the size of the little finger, springs from a larva which lives in the water, and is particularly found at the mouths of rivers, on the banks, in the mud of which it makes itself a dwelling. This larva is in existence for three years; at the end of

which term it changes almost suddenly into a fly, which appears about six in the evening, and dies at eleven at night.

EPHEMERIDES, in literary history, an appellation given to those books or journals, which show the motions and places of the planets for every day in the year. It is from the tables contained in these ephemerides, that eclipses, and all the variety of aspects of the planets, are found. The name is also given to periodical publications on various subjects.

EPIC, or *heroic poem*, a poem expressed in narration, formed upon a story partly real, and partly feigned ; representing, in a sublime style, some signal and fortunate action ; distinguished by a variety of great events ; and tending to form the morals, and affect the mind with the love of heroic virtue.

In the earliest stages of society, say the *Monthly Reviewers*, poetry has proved a happy vehicle for recording the exploits of the warrior, or describing any uncommon and grand appearance in nature ; and these sublime and heroic songs were attended with wonderful effects : but it is to be considered that poetry addresses itself chiefly to the imagination and the passions, which, in men untamed by civilization, are active, vigorous, and susceptible of the warmest impressions ; and, that in an improved state of society, both the one and the other are enfeebled by restraint, while the rational powers gather strength by daily exercise. This progress may be traced by any man who will pay attention to the operations of his own mind. Astonishment is succeeded by admiration ; admiration leads to inquiry and in-

vestigation ; and these cannot be performed without comparing and judging, which form the peculiar province of reason. Hence may be assigned one cause of an age of criticism being unfavourable to the exertion of original poetic genius ; for surely the mind that can read a poem with such calmness, as accurately to appreciate its merits and defects, can feel little of that warmth and enthusiasm which the bard wishes to inspire ;—a consideration that would be very mortifying to every poet of the present times, did he not experience, in common with his readers, the difficulty of forming a conception truly sublime, or soaring to any great heights in the regions of imagination.

EPICUREAN philosophy, the doctrine or system of philosophy maintained by Epicurus and his followers. His philosophy consisted of three parts, canonical, physical, and ethereal. The first was about the canons or rules of judging. The censure which Tully passes upon him for his despising logic, will hold true only with regard to the logic of the Stoics, which he could not approve of, it being too full of nicety and quirk. Epicurus was not acquainted with the analytical method of division and argumentation, nor was he so curious in modes and formation as the Stoics. Soundness and simplicity of sense, assisted with some natural reflections, was all his art. His search after truth proceeded only by the senses, to the evidence of which he gave so great a certainty, that he considered them as an infallible rule of truth, and termed them the first natural light of mankind.

In the second part of his philosophy he laid down atoms, space, and gravity as the first prin-

ciples of all things. He did not deny the existence of a God, but thought it beneath his majesty to concern himself with human affairs. He held him a blessed, immortal being, having no affairs of his own to take care of, and above meddling with those of others.

As to his ethics, he made the supreme good of man to consist in pleasure, and consequently, supreme evil in pain. Nature itself, says he, teaches us this truth, and prompts us from our birth to procure whatever gives us pleasure, and avoid what gives us pain. To this end he proposes a remedy against the sharpness of pain: this was to divert the mind from it, by turning our whole attention upon the pleasures we have formerly enjoyed: He held that the wise man must be happy, as long as he is wise; that pain, not depriving him of his wisdom, cannot deprive him of his happiness.

EPICYCLE, in the ancient astronomy, a little circle whose centre is in the circumference of a greater circle; or it is a small orb, or sphere, which being fixed in the deferent of a planet, is carried along with it; and yet, by its own peculiar motion, carries the planet fastened to it round its proper centre.

It was by means of epicycles, that Ptolemy and his followers solved the various phenomena of the planets, but more especially their stations and retrogradations. The great circle they called the eccentric or deferent, and along its circumference the centre of the epicycle was conceived to move; carrying with it the planet fixed in its circumference; which in its motion downwards proceeded according to the order of the signs, but, in moving upwards, contrary to that order. The highest point

of a planet's epicycle they called *apogee*, and the lowest *perigree*.

EPIDEMIC; a contagious disease is so termed that attacks many people at the same season. There are some epidemics which prevail every year, and which are produced by the various changes of the seasons. Thus, the spring is accompanied by inflammatory diseases; summer by complaints in the stomach and bowels; autumn by catarrhs; and winter by intermittents.

EPIGRAM, in poetry, a short poem or composition in verse, treating only of one thing, and ending with some lively, ingenious, and natural thought or point. Few men have succeeded in this species of poetry; and the greater part of those epigrams that have been most admired, are indebted for their reputation to a pun, or to the perverted sense of some ambiguous term. Yet it cannot be denied that epigrams have sometimes been made a pleasing vehicle for moral truth and pathetic sentiment.

The Latin epigram, by a false taste that prevailed in the beginning of the decay of pure Latinity, endeavours to surprize the reader by a point. Catullus wrote after the Greek manner, for he endeavours to close a natural thought with a delicate turn of words, and with the simplicity of a very soft expression. Martial was in some measure the author of the other way. Boileau says, the finesse and subtilty of the epigram should turn upon the words, rather than the thoughts, by which means he reduces it to the nature of a pun, or equivocate.

EPIGRAPHE, among antiquarians, denotes the inscription of a building, pointing out the time when,

the persons, by whom, the uses, and the like, for which it was erected.

EPIPHANY, a Christian festival, otherwise called the **Manifestation of Christ to the Gentiles**, observed on the sixth of January, in honour of the appearance of our Saviour to the magi, or wise men, who came to adore him, and bring him presents. The kings of England and Spain offer gold, frankincense, and myrrh, on the epiphany, or twelfth day, in memory of the offerings of the wise men to the infant Jesus.

EPISCOPALIANS, in church-history, an appellation given to those who prefer the episcopal government and discipline to all others. By the test act, none but episcopalians, or members of the Church of England, are qualified to fill any office, civil or military.

EPISODE, in poetry, a separate incident, story, or action, which a poet invents, and connects with his principal action, that his work may abound with a greater diversity of events: though, in a more limited sense, all the particular incidents of which the action or narration is compounded, are called episodes. Episodes serve to promote the action, to illustrate, embellish, and adorn it, and carry it to its proper period. Episodes are either absolutely necessary, or very requisite. All episodes are incidents, though all incidents are not episodes; because some incidents are not adventitious to the action, but make up the very form and series of it. Examples will explain this distinction: the storm in the first *Æneid* of Virgil, driving the fleet on the coast of Carthage, is an incident, not an episode, because the hero himself and the whole body

of his forces are concerned in it; and so it is direct and not a collateral part of the main action. The adventures of Nisus and Euryalus, in the ninth *Æneid*, are episodes, not incidents, i. e. not direct parts of the main action.

EPOCH, in chronology, a term or fixed point of time, whence the succeeding years are numbered or accounted. See **CHRONOLOGY**.

EPODE, in lyric poetry, the third or last part of the ode, the antient ode being divided into strophe, antistrophe, and epode. The epode is now a general name for all kinds of little verses that follow one or more great ones, of what kind soever they be; and in this sense, a pentameter is an epode after an hexameter.

EPSOM water, see *MINERAL waters*.

EQUATION, in algebra, the mutual comparing two equal things of different denominations, or the expression denoting this equality; which is done by setting the one in opposition to the other, with the sign of equality (=) between them: thus 3s.=36d. or 3 feet = 1 yard. Hence, if we put *a* for a foot, and *b* for a yard, we shall have the equation $3a = b$, in algebraical characters.

EQUATION of time, in astronomy and chronology, the reduction of the apparent time or motion of the sun, to equable, mean, or true time. The difference between true and apparent time arises from two causes, the excentricity of the earth's orbit, and the obliquity of the ecliptic.

EQUATOR, in geography, a great circle of the terrestrial globe, equidistant from its poles, and dividing it into two equal hemispheres; one north, and the other south. It is in degrees of the equa-

ter, that the longitude of places are reckoned; and as the natural day is measured by one revolution of the equator, it follows that one hour answers to $\frac{1}{15}^{\circ} = 15$ degrees: hence, one degree of the equator will contain four minutes of time; fifteen minutes of a degree will make a minute of an hour; and, consequently, four seconds answer to one minute of a degree.

EQUILIBRIUM, in mechanics, is when the two ends of a lever or balance hang so exactly even and level, that neither doth ascend or descend, but keep in a position parallel to the horizon, which is occasioned by their being both charged with an equal weight.

EQUINOCTIAL, in astronomy, a great circle of the celestial globe, whose poles are the poles of the world. It is so called, because whenever the sun comes to this circle, the days and nights are equal all over the globe; being the same with that which the sun seems to describe, at the time of the two equinoxes of spring and autumn.

EQUINOX, the time when the sun enters either of the equinoctial points, where the ecliptic intersects the equinoctial. It is so called, because when the sun is in these points, the days and nights are of an equal length all the world over. As the sun is in one of them, in the spring, viz. March 20th, it is called the vernal equinox; and in the other, in autumn, viz. September 23d, it is called the autumnal equinox.

EQUUS. See HORSE.

ERINACEOUS, European, the common hedgehog, is found in all the temperate climates of Europe and Asia. Its whole length is about eleven

inches, its colour generally a grey brown. It lives in hedges and thickets, and subsists on young toads, worms, beetles, crabs, fruits, and birds. It conceals itself in its hole during the day, and by night wanders in search of food. It builds its nest of moss, and produces four or five young ones at a birth.

These animals possess the curious, though not completely singular, property of rolling themselves into a compact form, like a ball, their spines only appearing, and presenting to the enemy an armed front, which he generally trembles to assail. The greater the danger it is exposed to, the more closely it is compacted, and it is difficult to compel it from this state to its usual form without the application of cold water, on being immersed in which it appears in its usual shape. It lies in this ball-like form during the winter in its mossy nest, insensible to the extremity of the cold, and, on the approach of spring, resumes its nocturnal researches. It is perfectly harmless, and in some countries is said to be domesticated, and in this state is employed by the Calmucks in their habitations to clear them from various annoying insects. See Plate. Nat. Hist. Fig 15.

ERMEN, in heraldry, is always argent and sable, that is, a white field, or fur, with black spots.

ESCAPE, in law, is where one who is arrested gains his liberty before he is delivered by course of law. Escapes are either in civil or criminal cases; and in both respects may be distinguished into voluntary and negligent; voluntary, where it is with the consent of the keeper; negligent, where it is for want of due care in him. In civil cases, after the prisoner has been suffered voluntarily to escape,

the sheriff can never retake him; but must answer for the debt; but the plaintiff may retake him at any time. In the case of a negligent escape, the sheriff, upon fresh pursuit, may retake the prisoner; and the sheriff shall be excused, if he has him again before any action brought against himself for the escape.

ESCUTCHEON, or *scutcheon*, in heraldry, is derived from the French *escusson*, and that from the Latin *scutum*, and signifies the shield whereon coats of arms are represented.

ESQUIRE, was anciently the person that attended a knight in the time of war, and carried his shield. This title has not, for a long time, had any relation to the office of the person, as to carry arms, &c. Those to whom the title of esquire is now of right due, are all noblemens' younger sons, and the eldest sons of such younger sons; and the eldest sons of knights, and their eldest sons; the officers of the king's courts, and of his household; counsellors at law, justices of the peace, &c. though those latter are only esquires in reputation: besides, a justice of the peace holds this title no longer than he is in commission, in case he is not otherwise qualified to bear it; but a sheriff of a county, who is a superior officer, retains the title of esquire during life, in consequence of the trust once reposed in him; the heads of some ancient families are said to be esquires by prescription. If an esquire be arraigned of high treason, he ought to be tried by a jury, each whereof have 40s. of freehold, and 100l. in goods; and a knight has no other privilege. The heir-apparent of an esquire, is privileged to keep grey-hounds, setting-dogs, or nets to take partridges

and pheasants, though he cannot dispend 10*l.* of estate of inheritance, or the value of 30*l.* of estate for life.

ESQUIRES of the king, are such as have that title by creation, wherein there is some formality used, as the putting about their necks a collar of SS, and bestowing on them a pair of silver spurs, &c. There are four esquires of the body to attend the king's person.

ESSENCE, in chemistry, denotes the purest, most subtile, and balsamic part of a body; extracted either by simple expression, or by means of fire, from fruits, flowers, and the like. Of these there are a great variety, used on account of their agreeable smell and taste, by apothecaries, perfumers, and others. Those extracted by means of fire, with more propriety are to be counted among the essential oils.

ESSENCE of bergamot, is a fragrant essence, extracted from a fruit which is produced by ingrafting a branch of lemon-tree, upon the stock of a bergamot-pear. It is imported from Italy and Sicily, particularly from Reggia and Messina. This spirit is extracted, by paring off the rind of the fruit with a broad knife, pressing the peel between wooden pincers against a sponge, and as soon as the sponge is saturated, the volatile liquor is squeezed into a phial.

ESSEES, or *Essenians*, in Jewish antiquity, one of three ancient sects among that people, who outdid the Pharisees in their most rigorous observances. They allowed a future state, but denied a resurrection from the dead. Their way of life was very singular; they did not marry, but adopted the

children of others; whom they bred up in the institutions of their sect; they despised riches, and had all things in common; and never changed their clothes till they were entirely worn out. When initiated, they were strictly bound not to communicate the mysteries of their sect to others; and if any of their members were found guilty of enormous crimes, they were expelled.

ESTATE, in law, signifies the title or interest that a person has in lands, tenements, or other effects; comprehending the whole in which a person hath any property, and will pass the same. Estates are either real or personal; otherwise distinguished into freeholds, which descend to heirs; or chattels, that go to executors or administrators. A fee simple is the amplest estate of which our law admits.

Estates are obtained several ways, as by descent from a father to a son; by conveyance or grant; by gift or purchase; or by deed or will.

ESTATE, in politics, a term that is variously defined. One has said that the three estates of Great Britain are, 1. the lords spiritual, 2. the lords temporal, 3. the commons; another has reduced the estates to two, 1. the lords, and 2. the commons; while the usual description of the three estates are, 1. the king, 2. the lords, 3. the commons.

In explaining the term estate generally, it has been said to denote the dominions of some prince, or the general *classes* into which the people are divided; but neither of these definitions are correct.

The word, which came into the English language from the French *état*, is derived from the Latin *status*, one of the senses of which is that of command, rule, or government. An estate, then, is a

ruling power, whether it consist in the united voice of many, or the will of one: now the ruling power of Great Britain are three; the king is one, the lords are one, and the commons are one. The king cannot be omitted in an enumeration of the estates, since it is clear that of *three* voices, he possesses *one*. The lords spiritual cannot be said to constitute an estate, but a part of an estate; for the whole house of lords has but one voice.

An estate is not necessarily the dominions of a prince; since a nation, whatever may be its internal arrangements, is, relatively with other nations, an estate: thus we say *the states or estates of Europe*: nor are the classes into which the people are divided estates, unless those classes constitute *ruling powers*.

ETCHING, the art of engraving on copper, by means of a pointed instrument, or needle and aquafortis, or nitro-muriatic acid. The operations incidental to etching are these: I. Varnishing the plate; II. Tracing the design; III. Etching; IV. Walling the plate; V. Biting or corroding; VI. Cleansing the plate.

I. "Varnishing the plate." The plate being moderately heated, by exposing the unpolished side to the flame of a candle or to a fire, a piece of varnish, covered with fine and clean silk is to be passed over the opposite surface, leaving a thin coat melted on the plate. The plate is to be held with a hand-vice. The varnish being thus laid on, a ball of cotton, inclosed in silk, is made use of to dab the plate over, in such a manner that no part is left uncovered by the varnish, nor the coating of an unequal or improper depth. The varnish being

thus smoothed on the plate, take a large wax candle, and having driven two nails into a wall, whereon to rest the plate, with the varnished side downward, apply the flame to the varnish, as close as may be without suffering the wick to touch it, and guide it under the whole, till it is of a fine shining black. The plate is then to be set upon its edge to cool, and particular caution observed lest any dust settle upon it while warm.

II. "Tracing the design." The outline of the subject being procured, by drawing, or by tracing with oiled-paper, the paper containing the design in the former case, or a thin sheet of a similar size in the other, is covered, on the side to be laid next the plate, with red chalk. The chalk is to cover the whole ; but care must be taken that none which will easily come off be left. The paper being laid on the plate, and fastened to its place, by means of white wax at the corners, the whole outline is to be traced with a needle. On removing the paper, the outline, in chalk, will be found on the varnish.

III. "Etching," The outline, thus obtained, is now to be traced with the needle on the copper, and the whole cleared by wiping the chalk away ; which may be done with soft leather. The degree of finishing intended to be given by means of corrosion being completed, and every accidental scratch upon the varnish stopped up, the etching, properly so called, is finished.

IV. "Walling the plate." A composition of wax prepared for the purpose, being made sufficiently warm for the requisite pliancy, is to be placed on all sides of the plate, in the manner of a wall, and fitted to contain a fluid on the surface.

V. "Biting or corroding." The nitrous spirit, attempered with water, is now to be poured on the plate. The varnish is impenetrable; and it corrodes only where the needle has been at work. Experience is here necessary: the liquor is not to be too weak; and, if too powerful, it will not only give the etching a coarse appearance, but break up weak parts of the varnish, and in a violent and rapid manner destroy the whole.

If accidents of this nature occur, the aqua-fortis must be poured off, and the plate washed with pure water, and dried at the fire; after which, the parts improperly exposed to the corrosion are to be covered with a soft varnish, manageable by means of a hair-pencil. The same measures are also to be taken when the lighter parts of the work are supposed to be bit sufficiently deep.

When the aqua-fortis operates, the etching is covered with air bubbles, green with the copper they contain: these are to be removed in a gentle manner, by means of a feather, introduced into the liquor.

VI. "Cleansing the plate." When the corrosion is finished, the plate must be washed and dried. The wall is then to be removed, and the varnish may be cleared away by heating the plate, adding oil, and wiping the whole with a woollen substance.

In this state, a proof is usually obtained from the printing-press; and if, as is commonly the case, the plate is to be finished with the graver, this is what now remains to be done.

"General observations." The plate, properly prepared, is to be procured from the copper-plate

maker ; the varnish, wax, and needles are to be had from the dealers in drawing materials.

The soft varnish, is the common varnish rendered somewhat liquid by means of turpentine : its consistence should not be thinner than is necessary for pencilling.

The variation of tone, or of light and heavy strokes, so essential to the print, is not to depend wholly upon the greater or less degree or duration of corrosion to which they are exposed. Needles of various sizes, as they are kept in the shops, are to be employed.

There is another species of etching, at present much practised, by which the effect of drawings in chalk or pencil is represented. In this art, a crayon or pencil is used instead of a needle, and the reverse of the design need not be covered with chalk. The artist, having the varnished plate under his paper, proceeds as if he were simply drawing ; and the pressure of the crayon or pencil is sufficient to cause the adhesion of the varnish to the paper, in such a manner as to leave an exact imitation of the design upon the copper, pierced through the varnish, and ready to receive the aqua-fortis. See VARNISH.

ETHER. The action of the more powerful acid, on alcohol, gives rise to an order of compounds of some importance from their peculiar properties. These, as produced by the different acids, vary somewhat in their qualities : they also agree, however, in the possession of certain general properties ; they are highly volatile, odorous, pungent, and inflammable, miscible with water, and capable of combining with alcohol, in every proportion.

These compounds are named *ethers*; the specific name of each being derived from the acid, from the action of which on alcohol it has originated, as the sulphuric, nitric, muriatic, or acetic ether.

ETHICS, the doctrine of manners, or science of moral philosophy. See **PHILOSOPHY**.

ETIQUETTE, a term denoting the forms of decorum, and primarily used by the French for a ticket or title affixed to a bag or bundle of papers expressing its contents. It is also used in the Spanish and some other courts to signify a particular account of what is to be daily done in the king's household, and in the chief ceremonies relating to it.

EVAPORATION, in natural philosophy, is the conversion of water into vapour, which in consequence of becoming lighter than the atmosphere, is raised considerably above the surface of the earth, and afterwards by a partial condensation forms clouds. It differs from exhalation, which is properly a dispersion of dry particles from a body. When water is heated to 212° , it boils, and is rapidly converted into steam; and the same change takes place in much lower temperatures; but in that case the evaporation is slower and the elasticity of the steam is smaller. As a very considerable proportion of the earth's surface is covered with water, and as this water is constantly evaporating and mixing with the atmosphere in the state of vapour, a precise determination of the rate of evaporation must be of very great importance in meteorology.

EUDIOMETRY. The measurement of the quantity of oxygen contained in atmospheric air, or indeed in any gas in which it is not intimately combined, is

named eudiometry, and the instrument by which it is performed, the eudiometer. To attain such a measurement, it is merely necessary to present to atmospheric air, some substance which combines with its oxygen, and which either does not afford any gaseous product, or affords one that is easily abstracted and measured. Different substances have been applied to this purpose. The fluid originally employed by Scheele, in the analysis of the air, the solution of sulphuret of potash, or what is rather more convenient, the sulphuret of lime, is perhaps superior in accuracy to any, at least if the air be not too long exposed to it, and be not in too small quantity proportioned to the quantity of fluid. The instruments for subjecting atmospheric air to such changes as may indicate its proportion of oxygen, have been called eudiometers. When a mixture of nitrous gas is to be made with atmospheric air, the most convenient apparatus consists in a glass tube closed at top, and graduated by a diamond into cubic inches and parts. The lower aperture may be widened, in order that the gases may more easily be passed up, and likewise to afford the facility of its standing alone upon the pneumatic shelf. It is likewise usual and advantageous to fit a stopper in the mouth by grinding; a cubic inch measure will be required for determining the quantities poured up. A bottle will do for this purpose, and the instrument may be made very well by a chemist who is obliged to work for himself; by taking any small bottle whatever, and pouring its contents of water, by successive times, into the tube placed mouth upwards. By this means he will obtain a graduation, which, whether

of the cubic inch or not, will answer the purpose of eudiometry.

When air is to be exposed to a liquid sulphuret, which absorbs the oxygen, the eudiometric tube may be immersed in the liquid. It consists of a small bottle, of the contents of about three ounces, intended to contain the eudiometric liquid; into the neck a tube is accurately fitted by grinding, which holds precisely a cubic inch, and is divided into a hundred equal parts, and on one side the bottle, near its bottom, there is a neck into which a stopper is ground in the usual manner. In the use of this apparatus the bottle is first filled with the liquid employed, which is best prepared by boiling a mixture of quick lime and sulphur with water, filtering the solution, and agitating it for some time in a bottle half filled with common air. The tube, filled with the gas under examination, or with common air, if that be the subject of the experiment, is next put into its place, and, on inverting the instrument, the gas ascends into the bottle, where it is brought extensively into contact with the liquid, by brisk agitation. An absorption of oxygen, if present, ensues, and to supply its place, the stopper in the side of the bottle is opened under water, a quantity of which rushes into the bottle; the stopper is then replaced under water, the agitation renewed, and these operations are alternately performed, till no farther diminution takes place; the tube is then withdrawn, while the neck of the bottle is under water, and after the tube has been kept in this situation for a few minutes, the quantity of the diminution will be seen by the graduated scale upon the tube.

Tubes fitted up for exploding a mixture of hydrogen, or other inflammable gases, with oxygen gas, have been called the endimeters of Volta; they are usually made very strong, and are provided with two wires, which pass through sockets cemented in holes drilled through the glass, near the top, which is not perforated. The electric spark being passed between these wires, gives fire to the gases, not without some risk of blowing out the confining liquid, or breaking the glass.

EULOGY, a name by which the Greeks call the *panis benedictus*, or bread over which a blessing is pronounced; and which is distributed to those who are unqualified to communicate. The name eulogiae was anciently given to the consecrated pieces of bread, which the bishops and priests sent to each other, for the keeping up a friendly correspondence; those presents likewise which were made out of respect or obligation, were called eulogiae.

EUROPE, one of the quarters of the world, bounded on the north by the Frozen Ocean; on the west by the Atlantic; on the south by the Mediterranean, which separates it from Africa; and eastward by the Archipelago, the Black Sea, the rivers Don, Volga, and Oby; which divide it from Asia. Europe lies between nine degrees, thirty-five minutes, west, and seventy-two degrees, twenty-five minutes, east, longitude, and between thirty-five and seventy-two degrees of north latitude. It is about 3300 miles in length, from cape St. Vincent in Portugal to the river Oby in Russia, and 2,200 miles in breadth, from Cape-Matsapan, in the Mores, to Cape-North, in Norway.

II. Its principal peninsulas are those of Spain and Portugal, the Crimea, Norway, Sweden, and Jutland; its mountains, the Pyrenees, the Alps, the Apennines, and the Karpacs or Crapacs; its capes, North, Finisterre, Saint-Vincent, and Matapan; its islands, Great Britain, Ireland, Corsica, Sardinia, Sicily, Malta, Candia, Cyprus, the Archipelago, Majorca, Minorca, Ivica, Zeland, and Fionia; its straits, the Sound, St. George's Channel, Dover Channel, Gibraltar, Messina, and the Dardanelles: its gulphs or bays, those of Bothnia, Finland, Murray, Biscay, Lions, Gênea, Venice, and Lepanto; its rivers, the Volga, Don, Nieper, Rhone, Danube, and Rhine; its lakes, Onega, Weter, Melor, Geneva, Constance, Major and Corni.

III. The principal geographical divisions of Europe are, 1. the north, 2. the middle, and 3. the south: the north or upper division contains Russia, Sweden, Denmark, Norway, and the islands of Great Britain, Iceland, Greenland, and those of the Baltic; the middle division comprehends Poland, Germany, Austria, Hungary, Bohemia, the Low Countries, and France; the southern division comprehends part of Turkey, the greater part of Greece, Switzerland, Italy, Spain, Portugal, and the islands of the Mediterranean.

IV. The principal political divisions are:

- | | |
|--------------------------|------------------------|
| 1. Sweden, | 7. Italy, |
| 2. Denmark, | 8. European-Turkey, |
| 3. Great Britain, | 9. Russia, |
| 4. The United Provinces, | 10. Prussia, |
| 5. France, | 11. Germany, |
| 6. Spain and Portugal, | 12. Hungary & Bohemia, |
| | 13. Switzerland. |

V. The governments of Europe are various : in general, all bear traces of the antient feudal system. Those of Great Britain and Sweden consist in the happy combination of monarchial, aristocratical, and popular power : others, called absolute monarchies, are rather aristocracies ; and to this class belong the republics : unless an exception be made in favour of France, which may, at the present moment, be a monarchy of the most arbitrary kind.

VI. The established systems of religious doctrine and discipline, save in the dominions of the Porte, are all Christian.

VII. The languages are various ; the principal radical ones are the Latin, the Teutonic, and Slavonic. The French, a dialect of the Latin, is spoken by all Europeans of education.

VIII. Relatively to the earth in general, the climate of Europe is temperate throughout. Placed in the same comparative view, it is moderate in its productions ; and this circumstance, together with its populousness, renders the prevailing character of its inhabitants that of activity and enterprize. Several discoveries of the utmost importance in the history of mankind, particularly that of the art of printing, have been made, or at least vigorously employed, in this quarter of the globe. The arts and sciences are pursued with zeal ; a spirit of admirable ethics generally diffused ; and if Europeans, who would describe themselves as better and more wise than all the rest of mankind, are to be suspected of some partiality, it must yet be allowed that the natives of this part of the earth are at least entitled to rank as highly as those of any other.

Emancipation, a title antiently given to kings, but

at present to ambassadors, governors, and commanders in chief.

EXCHANGE, in commerce, the receipt or payment of money in one country for the like sum in another, by means of *bills of exchange*.

A in London is creditor to B in Paris, to the amount of £.100. C in London is debtor to D in Paris, in a like sum : by the operation of the bill of exchange, the London creditor is paid by the London debtor, and the Paris creditor is paid by the Paris debtor ; and, consequently, two debts are paid, though no specie is sent from London to Paris, or from Paris to London.

This is the principle of a bill of exchange ; and the great convenience here represented is the foundation of exchange itself. That variation above and below par, which is called the course of exchange, results from the same causes that act upon the price of commodities of every other kind. If bills upon Paris be scarce, that is, if Paris is but little indebted to London, the London creditor, who wants bills on Paris to remit to that city, is obliged to purchase them dearly ; the course of exchange is above par : if, on the other hand, London owes less to Paris, than Paris owes to London, Paris bills will be proportionably plenty, and the exchange with that city below par. Hence, it is a maxim that, when the course of exchange rises above par, the balance of trade runs against the country where it rises.

When merchants have occasion to draw and remit bills for the liquidation of their own debts, active and passive, in distant parts, they meet upon the exchange ; where the creditors upon Paris,

when they want money for bills, look out for those who are debtors to it. The debtors to Paris, on the other hand, when they want bills for money, seek those who are creditors upon it. This market is constantly attended by brokers, who relieve the merchants of the trouble of searching for those he wants. To the broker every one communicates his wants, so far as he finds it prudent; and by going among all the merchants, the broker discovers the side upon which the greater demand lies, for money or for bills.

While the *course* of exchange, however, is in a perpetual flux, rising and falling according to the circumstances of trade, the *par* of exchange is of a more permanent nature. As the monies and species of almost every nation differ, not only in their current prices, but also in their intrinsic value, there is a just and certain par established between them, according to the real and effective worth of each species, without any regard to their currency in the countries where they are coined; and the par is, by some authors, supposed to be of two sorts, viz. the one of real monies, the other of exchanges, or imaginary species, though both seem to be the same thing, as having a necessary dependence on each other. See PAR.

EXCHANGE also signifies a building, or other place in considerable trading cities, wherein the merchants, agents, bankers, brokers, and other persons concerned in commerce, meet on certain days, and at certain times thereof, to confer and treat together of matters relating to exchanges, remittances, payments, adventures, assurances,

freights, and other mercantile negotiations, both by sea and land.

EXCHEQUER, in the British jurisprudence, an ancient court of record, in which all causes concerning the revenues and rights of the crown are heard and determined, and where the crown-revenues are received. It took this name from the cloth that covered the table of the court, which was partly coloured or chequered. This court is said to have been erected by William the conqueror. In the exchequer, some reckon seven courts, viz. those of pleas, accounts, receipts, exchequer-chamber, (which is an assembly of all the judges on difficult matters in law) errors in the exchequer, errors in the king's bench, and lastly, the court of equity in the exchequer: but, for dispatch of business, it is generally divided into two parts; one of which is chiefly occupied in the judicial hearing and deciding of all causes relating to the king's coffers, formerly termed the exchequer of accounts; the other is called the receipt of the exchequer, as being principally employed in receiving and payment of money. Officers of the receipt may take one penny in the pound, as their fee, for sums issued out; and they are obliged, without delay, to receive the money brought thither; and the money received is to be put in chests under three different locks and keys, kept by three several officers. All sheriffs, bailiffs, &c. are to account in the exchequer; and in the lower part, termed the receipt, the debtors of the king, and persons in debt to them, the king's tenants, and the officers and ministers of the court, are privileged to sue one another, or any

stranger, and to be sued in the like actions as are brought in the courts of king's bench and common pleas. The judicial part of the exchequer, is a court both of law and equity. The court of law is held in the office of pleas according to the course of common-law, before the barons ; in this court, the plaintiff ought to be debtor or accountant to the king. The court of equity is held in the exchequer chamber before the treasurer, chancellor, and barons ; but, generally, before the barons only ; the lord chief-baron being the chief judge to hear and determine all causes. The proceedings in this part of the exchequer, are by English bill and answer, according to the practice of the court of chancery ; with this difference, that the plaintiff here must likewise set forth that he is a debtor to the king, whether he be so or not. It is in this court of equity that the clergy exhibit bills for the recovery of their tythes. Here too the attorney-general exhibits bills for any matters concerning the crown ; and a bill may be exhibited against the king's attorney by any person aggrieved in any cause prosecuted against him on behalf of the king to be relieved therein : in which case the plaintiff is to attend on the attorney-general with a copy of the bill, and procure him to give in an answer thereto ; in the making of which he may call in any person interested in the cause, or any officer or others to instruct him, that the king be not prejudiced thereby ; and his answer is to be put in without oath. Besides the business relating to debtors, farmers, receivers, accountants, &c. all penal punishments, intrusion, and forfeitures upon popular actions, are matters likewise cognizable by

this court; where there also sits a puisne baron, who administers the oaths to high sheriffs, bailiffs, auditors, receivers, collectors, comptrollers, surveyors and searchers of all the customs, &c.

Excise, from the Belgic word *accuisse*, "tribute," an inland duty, paid in some instances upon the consumption of a commodity, and in others upon the whole sale. The excise was first introduced by the parliament which beheaded Charles I. and its great founder was Mr. Pym. The excise-laws nurse a multitude of offences, and give arbitrary power to a number of individuals very little qualified to exercise it; but they are considered as producing a revenue with a moderate comparative expence in its collection. The excise is one of the most considerable branches of the national revenue. It was formerly farmed out, but is now managed for the government by commissioners, who receive the whole product of the excise, and pay it into the exchequer.

Excommunication, an ecclesiastical penalty or censure, whereby such persons as are guilty of any notorious crime or offence, are separated from the communion of the church, and deprived of all spiritual advantages. In the present state of church-government in England, excommunication is seldom used but as a sort of writ of outlawry on contempt of the bishop's court, in the several description of causes that belong to ecclesiastical jurisdiction. It is published in the church, and if the offender does not submit in forty days, the civil magistrate interposes, and the excommunicated person is imprisoned till he submits, and obtains absolution. Excommunication disables a person from

doing any judicial act, as suing in an action at law, or being a witness.

EXECUTION, in law, the completing or finishing some act; as of judgment or deed, and it usually signifies the obtaining possession of any thing received by judgment of law.

EXECUTION of judgment, in criminal cases. This must be pursuant to the judgment, and the king may not alter it, for this reason, that no execution can be warranted by law but where it is according to the judgment given; yet he may grant a pardon, and remit part of the execution in judgment for treason, that is to say, all but beheading. The execution of criminals is to be made by the proper officer; and if the sheriff, or other officer impowered to do it, alters the execution, even so far as to change the place appointed for another, or any other executes an offender, or if he be killed without authority of law, it is felony. Where a person condemned to die comes to life after he is hanged, as the judgment is not really executed till he is dead, he is to be hung up again; and the bodies of felons are forfeited to the king by the execution, who may dispose of them as he pleases.

EXECUTOR, in law, a person appointed by another's last will and testament, to have the execution of the same after his decease, and the disposing of the testator's goods and effects, according to the intent of the will. Where there is no executor, there is properly no will; and where there is no will, there can be no executors: but this only regards goods; for where lands in fee are devised, it is a good will, though no executors be named.

EXERCISE, in animal economy, such an agitation

of the body as is conducive to health. Walking is the most gentle species of exercise. It promotes perspiration, and, if not continued too long, invigorates and strengthens the system. As the most simple and wholesome drink, namely water, is within every body's reach ; so this species of simple and wholesome exercise is in every body's power, who has the use of his limbs. To such as can bear it, walking frequently up hill is recommended. The inhabitants of mountainous countries are generally healthy and long-lived. This is commonly attributed to the purity of the air in such places: yet the frequent and necessary exercise of climbing mountains, which these people undergo, adds much to their health and longevity. Every one knows how much walking up a hill tends to create an appetite. This depends upon its increasing the insensible perspiration :—an excretion with which the appetite, and the state of the stomach in general, are much connected. Running is too violent to be used often, or continued for any length of time. The running-footmen in all countries are short-lived :—Few of them escape consumptions, before they arrive at their thirty-fifth year. Sweating and perspiration have been found to be incompatible :—The former always suppresses the latter. Dancing is a most salutary exercise. Fencing calls forth most of the muscles into exercise, particularly those which move the limbs. Too much cannot be said in praise of swimming. Besides exercising the limbs, it serves to wash away the dust which is apt to mix itself with the sweat of our bodies in warm weather. Bathing and swimming, frequently in the summer season, is strongly recommended ;

but not too long a stay in the water at one time, lest, instead of increasing the vigour of the constitution, it be lessened. To these species of exercise may be added skating, jumping, the active plays of tennis, bowles, quoits, golf, and the like. Talking—reading with an audible voice—singing and laughing—all promote the circulation of the blood through the lungs, and tend to strengthen these important organs, when used in moderation. The last has the advantage over them all, inasmuch as the mind co-operates with it. “May unfading laurels,” says a writer on this subject, “bloom to the latest ages upon the grave of him who said, that, ‘every time a man laughs, he adds something to his life.’”

Riding in a chariot has but few advantages, inasmuch as we are excluded from the benefit of fresh air; an article, upon which the success of all kinds of exercise in a great measure depends. It should be used only by such persons as are unable to walk or to ride on horseback. It is to be lamented, that those people use this mode of exercise the most, who stand in the greatest need of a more violent species.

Riding on horseback is the most manly and useful species of exercise for gentlemen. Bishop Burnet expresses his surprize at the lawyers of his own time being so much more long-lived (*cæteris paribus*) than other people, considering how much those of them, who become eminent in their profession, are obliged to devote themselves to constant and intense study; and he attributes it entirely to their riding the circuits so frequently, to attend the different courts in every part of the kingdom.

Riding may be varied according to our strength, or the nature of our disorder, by walking, pacing, trotting, or cantering our horse. All those diseases which are attended with a weakness of the nerves, such as the hysteric and hypochondriac disorders, which show themselves in a weakness of the stomach and bowels, indigestion, low spirits, &c. require this exercise. In riding to preserve health, eight or ten miles a day are sufficient to answer all the purposes we would wish for; but in riding to restore health, these little excursions will avail nothing. The mind, as well as the body, must be roused from its languor. In taking an airing, as it is called, we ride over the same ground for the most part every day. We see no new objects to divert us, and the very consideration of our riding for health sinks our spirits so much, that we receive more harm than good from it. Upon this account long journeys are recommended to such people, in order, by the variety or novelty of the journey, to awaken or divert the mind. Many have by these means been surprised into health.

With respect to the attention to exercise that should be recommended to those of studious habits, it is very generally observed that how agreeable ~~power~~ they may be to the mind, they are very far from being equally salutary to the body. The delicate springs of our frail machines lose their activity and become enervated, and the vessels choked with obstructions, when we totally desist from exercise, and the consequences necessarily affect the brain: a mere studious life is therefore equally prejudicial to the body and the mind. The limbs, under such circumstances, become stiff; an awk-

ward manner is contracted ; and a certain disgustful air attends every action. An inclination to study is highly commendable ; but it ought not to be carried to the extent of aversion to society and motion. The natural lot of man is to live among his fellows ; and whatever may be his situation in the world, there are a thousand occasions wherein he must render himself agreeable ; to be active and adroit ; to dance with grace ; to command the impetuous steed ; to defend himself against an enemy ; to preserve his life by dexterity, as by leaping, swimming, &c. Many rational causes have therefore given rise to the practice of particular exercises ; and those legislators who deserve to be called the most sagacious and benevolent, have instituted opportunities for enabling youth who devote themselves to study, to become expert, also, in laudable exercises.

“ We shall walk, run, dance, swim, fence, sail, and ride to little purpose (says Dr. Tissot), unless we make choice of an agreeable friend to accompany us. Solitude is the bane of man ; insomuch, that it is difficult to tell which suffers most, the soul in its qualities, or the body in its temperament, from being alone. Too great a concourse of people breeds disease. Too much company is destructive to cheerfulness. For the sake of both mind and body, therefore, we should move in a little circle, and let heaven circumscribe it for us. Let our wives and children be always around us ; or, if we are not blessed with these, let a few cheerful friends be our constant companions.”

“ Exercise, it is said, from the seventh to the eleventh hour after eating, wastes more insensibly

in one hour, than in three at any other time." If this be true, then (supposing you sup at eight o'clock in the evening) that exercise, which is used from five till seven o'clock in the morning, will promote the greatest discharge, in a given time, by insensible perspiration. Such as make dinner their principal meal are excluded from the benefit of this aphorism ; as the interval, between the seventh and the eleventh hour with them (supposing they dine at two o'clock in the afternoon) is from nine in the evening till one o'clock in the morning—a time, in which darkness, and the unwholesome night air, forbid walking, riding, and almost every other species of manly exercise we have described.

I know it will be objected here, that we often see labourers return, after a full meal, to their work, without feeling any inconvenience from it. This is like the argument of those who recommend raw flesh to the human species, because the strongest and fiercest animals in nature eat it. It is because they are so fierce and so strong, that they are able to digest raw flesh. In like manner it is, because these men are naturally so strong, that labour immediately after eating does not hurt them. But let me ask, whether you have not observed such people leave their tables with reluctance?—How slowly do they return,—and how many excuses do they form to loiter away a little time, before they renew their work !

But farther : there is another reason why I would recommend this practice of eating the chief meal in the evening, which is indeed a little foreign to our present subject. In a country like this, where the constant labour of every individual is so

very necessary, the general use of this custom would add several hours to every day, and thus have the most beneficial effects upon the agriculture—commerce—and manufactures of the country, exclusive of its influence upon the health of the inhabitants.

After what has been said, I need hardly add, that exercise should never be used with a full stomach. Persons who use exercise, either to preserve or restore health, immediately after eating a hearty meal, resemble the man “who fled from a lion, and a bear met him; and who went into the house, and leaned his hand upon the wall, and a serpent bit him.”

EXHAUSTION, in mathematics, a method in frequent use among the ancient mathematicians, as Euclid, Archimedes, &c. that proves the equality of two magnitudes, by a deduction *ad absurdum*, in supposing that, if one be greater or less than the other, there would follow an absurdity.

This is founded upon what Euclid saith in his tenth book, viz. that those quantities, whose difference is less than any assignable one, are equal. For if they were unequal, be the difference never so small, yet, it may be so multiplied, as to become greater than either of them, if not so, then it is really nothing. This he assumes in the proof of the 1st proposition of book 10, which is, that if from the greater of two quantities, you take more than its half, and from the remainder more than its half, and so continually, there will at length remain a quantity less than either of those proposed.

On this foundation mathematicians demonstrate,

that if a regular polygon of infinite sides be inscribed in, or circumscribed about a circle; the space, that is the difference between the circle and the polygon, will by degrees, be quite exhausted, and the circle be equal to the polygon.

Exocoetus, the flying fish, a genus of fishes of which there are three species: we shall particularly notice the *Exocoetus exiliens* or the Mediterranean flying-fish. This is about fourteen inches in length, and is found principally in the Mediterranean and Atlantic seas, frequently alone, and sometimes in small companies. By the extraordinary length of its pectoral fins it is enabled to quit the water and support a flight, about three feet above the surface, for the distance of eighty or a hundred yards, after which it is obliged to return to the water and moisten its fins, which even in this short progress, become hard and dry. These fishes are persecuted by the dorado under the water, and by the gull, or albatross, above the surface of it, and thus often escape destruction by the one only to incur it from the other. This faculty of maintaining short flights in the air is possessed by several other fishes, particularly by the scorpena and the trigla. See Plate, Nat. Hist. Fig. 16.

EXPANSION, in natural philosophy, the enlargement or increase of bulk in bodies, chiefly by means of heat. This is one of the most general effects of caloric, being common to all bodies whatever, whether solid or fluid, or in an aeriform state. In some cases bodies seem to expand as they grow cold, as water in the act of freezing; this however, is known to be no exception to the general rule, but is owing to the arrangement of the particles, or to

crystallization, and is not a regular and gradual expansion like that of metals, or other solid substances, by means of heat. In various metals like, wise an expansion takes place in passing from a fluid to a solid state, which is accounted for in the same way. The expansion of solids is exhibited by the PYROMETER (which see); a rod of iron, for instance, becomes sensibly longer and larger in all its dimensions in passing from a low to a high state of temperature. The expansion of fluids is shewn by the thermometer, and is the principle upon which that useful instrument is constructed; by immersing a thermometer into hot water, the mercury, or other fluid, contained in it immediately expands. See THERMOMETER. The degree of expansion produced in different liquids, varies very considerably. In general, the denser the fluid, the less the expansion; water expands more than mercury; and alcohol, which is lighter than water, and expands more than water. The expansion of aeriform fluids may be exhibited by bringing a bladder, partly filled with air, and the neck closely tied, near the fire; the bladder will soon be distended, and will, if the heat be strong enough, burst. Metals expand in the following order, those that expand most are placed first: zinc, lead, tin, copper, bismuth, iron, platina.

EXPLOSION, in natural philosophy, a sudden and violent expansion of an aerial, or other elastic fluid, by which it instantly throws off any obstacle that happens to be in the way, sometimes with incredible force, and in such a manner as to produce the most astonishing effects. It differs from expansion in this, that the latter is a gradual and continued power, acting uniformly for some time, whereas,

the former is always sudden, and only of momentary duration. The expansions of solid bodies do not terminate in violent explosions, on account of their slowness, and the small space through which the metal, or other expanding substance moves. Thus wedges of dry wood driven into stone, and wetted, will cleave the most solid blocks, but they never throw the parts to any distance, as is the case with gunpowder ; but the expansion of elastic fluids will burst solid substances, and throw the fragments a great way off: for this two reasons have been assigned: 1. The immense velocity with which aerial fluids expand, when suddenly affected with high degrees of heat: and 2. The great celerity with which they acquire heat, and are affected by it. As an example, air when heated as much as iron, when brought to a white heat, is expanded to four times its bulk, but the metal itself will not be expanded the 500th part of the space. In the case of gunpowder, which is well known as an explosive substance, the velocity with which the flame moves, is estimated at 7000 feet in a second. Hence the impulse of the fluid is inconceivably great, and the obstacles on which it strikes are hurried off with vast velocity, viz. at the rate of 27 miles per minute. The velocity of the bullet is also promoted by the sudden propagation of the heat through the whole body of air, as soon as it is extricated from the materials of which the gunpowder is made, so that it strikes at once. Hence it has been inferred, that explosion depends first on the quantity of elastic fluid to be expanded; secondly, on the velocity it acquires by a certain degree of heat; and thirdly,

1. The first part of the document is a letter from the President of the United States to the Congress, dated January 3, 1863. It is a very long letter, and it contains a great deal of information about the state of the country at that time. The President talks about the war, and how it is going. He also talks about the economy, and how it is doing. He mentions the fact that the Union is still together, and that the people are still loyal to the government. He also talks about the fact that the war is still going on, and that the Union is still fighting for freedom and justice for all.

2. The second part of the document is a letter from the Secretary of the Treasury to the Congress, dated January 3, 1863. It is a very long letter, and it contains a great deal of information about the state of the country at that time. The Secretary talks about the war, and how it is going. He also talks about the economy, and how it is doing. He mentions the fact that the Union is still together, and that the people are still loyal to the government. He also talks about the fact that the war is still going on, and that the Union is still fighting for freedom and justice for all.

3. The third part of the document is a letter from the Secretary of the Interior to the Congress, dated January 3, 1863. It is a very long letter, and it contains a great deal of information about the state of the country at that time. The Secretary talks about the war, and how it is going. He also talks about the economy, and how it is doing. He mentions the fact that the Union is still together, and that the people are still loyal to the government. He also talks about the fact that the war is still going on, and that the Union is still fighting for freedom and justice for all.

4. The fourth part of the document is a letter from the Secretary of the Navy to the Congress, dated January 3, 1863. It is a very long letter, and it contains a great deal of information about the state of the country at that time. The Secretary talks about the war, and how it is going. He also talks about the economy, and how it is doing. He mentions the fact that the Union is still together, and that the people are still loyal to the government. He also talks about the fact that the war is still going on, and that the Union is still fighting for freedom and justice for all.

5. The fifth part of the document is a letter from the Secretary of the War to the Congress, dated January 3, 1863. It is a very long letter, and it contains a great deal of information about the state of the country at that time. The Secretary talks about the war, and how it is going. He also talks about the economy, and how it is doing. He mentions the fact that the Union is still together, and that the people are still loyal to the government. He also talks about the fact that the war is still going on, and that the Union is still fighting for freedom and justice for all.



- Fig. 15. *Erinaceus Europaeus*. common Hedge-hog. Common Hedge.
 Fig. 16. *Exocoetus azihens*. Oceanic flying-fish.
 Fig. 17. *Falco Chrysaetos*, Golden Eagle.
 Published by J. Harris, & Pauls Co. 25th.

on the celerity with which the degree of heat affects the whole expansile fluid.

EXPORTATION, that part of foreign commerce which consists in sending out goods for sale, and which is therefore the *active* part of trade, as *importation*, or the purchasing of goods, is the *passive*.

EYE, the organ of vision. The eye-ball is the immediate agent in refracting the rays of light, and collecting them into a point, so as to form an image of the object from which they are reflected. For this purpose, there is in it a series of perfectly transparent parts, which execute the various refractions, a nervous pulp on which the rays of light thus refracted make an impression to be conveyed to the sensorium by the optic nerve. See **OPTICS**. The visual organ, simple, when thus considered, becomes much more complicated if we include all the apparatus added for the purposes of protection or assistance. The muscles which move the globe in various directions, the eye-lids, which cover and protect in front, and the parts which secrete the tears, and convey them into the cavity of the nostril, are all so intimately connected in situation and function with the globe, that they must be included in the general description.

F.

F, the sixth letter of the alphabet, is, by some, reckoned a mute, by others a semi vowel. It has nearly the same sound as the Greek ϕ , or *ph* in English words, and is only written in words of Latin origin, *ph* being used instead of it in those

derived from the Greek. *F*, as a numeral, denotes 40, and with a dash over it thus *F̄* 40,000.

F, in the criminal law, a mark put upon the thumb of a felon, with a hot iron, on his being admitted to benefit of clergy.

F, or *fa*, in music, one of the syllables invented by Guido Aretime, to mark the fourth note of the modern scale, which rises thus: *ut, re, mi, fa*. Musicians distinguished two *fa*'s, viz. the flat, and the sharp or natural, called *bequarre*.

FABLE, the narration of an incident by which some moral truth is illustrated and impressed. The fabulist describes the circumstances as having really happened; but it is generally the offspring of his own imagination; hence, when a story is called fabulous, the reality of the event that it relates is intended to be denied. In the farther indulgence of the inventive powers, fabulists have proceeded to personify ideas, and to indue every created thing with the faculties of reason and speech. In so doing, however, though the field he enters may appear extensive, it is not unbounded. He is still confined within certain laws; for there is a considerable difference between romance and absurdity: a rose may be said to speak, but not to lead an army. There is a distinction, though so little observed that a novel word must be used even to express it, between what is supernatural and that which is contranatural. We may exhibit unusual things;

But not, that nature should revers'd appear,
Mix mild with fierce, and gentle with severe;
Prophane her laws to contradiction's height,
Tygers with lambs, with serpents birds unite.

"We are told by the Grecian writers," says sir William Jones, "that the Indians were the wisest of nations; and in moral wisdom they were very eminent; their system of ethics is yet preserved; and the fables of Vishnusauman, whom we ridiculously call Pilpay, are the most beautiful, if not the most ancient collection of apologues in the world: they were first translated from the sanscrit, in the sixth century, by the order of Buzerothum-ihir, or Bright as the Sun, the chief physician, and afterwards vizir of the great Anúsheriván, and are extant, under various names, in more than twenty languages; but their original title is *Hipotedésa*, or *Amicable Instruction*; and as the very existence of Æsop, whom the Arabs believe to have been an Abyssinian, appears rather doubtful, I am not disinclined to suppose, that the first moral fables which appeared in Europe, were of Indian or Ethiopian origin."

In the same sense as that already considered, the plot or *incident* of an epic or dramatic poem is called the *fable*.

FABULOUS age, that period in the history of every nation in which supernatural events are represented to have happened.

FACE, in anatomy; the bones of the face are divided into those of the upper and under jaw: the upper consists of thirteen bones, and the under is formed of one bone. The muscles of the face are those of the eye-lid, eye-ball, nose, mouth, and lips. The human face is called the image of the soul, as being the seat of the principal organs of sense; and the place whence the ideas, emotions, &c. of the soul are chiefly set to view. Pride and

disdain are shown in the eye-brows; modesty on the cheeks; majesty in the forehead, &c. It is the face shews the sex, age, temperament, health, disease, &c. The face, considered as the index of the passions, habits, &c. of the person, makes the subject of physiognomy. Face, among painters and artists, is used to denote a certain dimension of the human body, adapted for determining the proportion which the several parts should bear to one another: thus, the different parts of the body are said to consist in length, of so many faces.

FACTOR, in commerce, is an agent or correspondent residing beyond the seas, or in some remote part, commissioned by merchants to buy or sell goods on their account, or assist them in carrying on their trade.

FACTORY, is a place where a considerable number of factors reside, to negotiate for their masters and employers. The most considerable factories belonging to the British, are those established in the East Indies, Portugal, and Turkey.

FACULTY, in law, a privilege granted to a person, by favour and indulgence, of doing what, by law, he ought not to do. For granting these privileges, there is a court under the archbishop of Canterbury, called the court of the faculties, the chief officer whereof is styled master of the faculties, who has a power of granting dispensations in divers cases, as to marry without the bans being first published; to eat flesh on days prohibited; to ordain a deacon under age; for a son to succeed his father in his benefice, or a clerk to hold two or more livings.

FACULTY, in the schools, a term applied to the

different members of an university, divided according to the arts and sciences taught there; thus, in most universities, there are four faculties: 1. of arts, which include humanity and philosophy; 2. of theology; 3. of physic; and, 4. of civil law. The degrees in the several faculties of our universities are those of bachelor, master, and doctor.

FACULTY of advocates, a term applied to the college or society of advocates in Scotland, who plead in all actions before the court of session. They meet in the beginning of every year, and choose the annual officers of the society, viz. dean, treasurer, clerks, private and public examiners, and a curator of their library. The manner of admission into the faculty of advocates is by a trial in the civil law, and Scotch law: the person desiring to be admitted, having, upon petition, obtained a recommendation to the dean of the faculty, he gives a remit to the private examiners, who are nine in number, and who, after their election, having divided the body of the civil law into nine parts, each taking one, appoint a diet for examination; in this diet there must be at least seven present, each of whom examines the candidate; and the question being put, Qualified, yea or no? they give their opinion by balloting, upon which the candidate is either admitted by signing his petition, or remitted to his studies. After the private trial, the dean of the faculty assigns the candidate a title of the civil law, for the subject of a thesis, which being distributed among the advocates, the faculty meet on a day appointed, when three at least of fifteen public examiners dispute against the thesis; and afterwards the faculty give their opinions by balloting,

as in the private trial. If the candidate is found qualified, the dean assigns him a law for an harangue before the lords, which harangue being made, he is admitted a member of the faculty, upon paying the fees, taking the oaths to the government, and an oath to be faithful in his office.

FÆCULA, in chemistry, the substance obtained by grinding certain vegetables or grain in water, and the *fæcula* is that part which, after standing some time, falls to the bottom. Starch is made from the *fæcula* of wheat.

FAGUS, in botany, the beech-tree, a genus of the monœcia order of the polyandria class. It contains three species: of which the beech-tree rises to the height of sixty or seventy feet, and in stateliness, and grandeur of outline, vies with the oak. Its leaves are oval and serrated; its flowers are produced in globular catkins, and succeeded by angular fruit, called *mast*. Its bark has a peculiar silvery appearance, which, added to the gracefulness of its port, and the elegance of its foliage, renders the whole tree among the first in beauty. Its wood is much employed in turnery, and in cabinet-making, particularly in the construction of chairs. The mast yields a good oil for lamps, and is a favourite food with mice, squirrels, and swine.

The chesnut-tree, another species, is capable of growing to a vast size. There is one upon mount Etna, called "*The chesnut-tree for a hundred horses.*" Mr. Howel, who went from Aci to examine it, describes the circumference of its trunk to be one hundred and sixty feet. It is quite hollow, but this does not affect its verdure; for the chesnut, like the willow, depends upon its bark for subsist-

ence, and as it becomes aged loses its internal part. Within the cavity, a house has been built, the inhabitants of which have an oven for drying nuts, almonds, and chesnuts, of which they make conserves; and, what the traveller justly laments, they frequently supply themselves with fuel from the tree under which they live.—It has its name from a tradition that Jane of Arragon, spending some time in Sicily, on her way from Spain to Naples, visited the mountain, and, a storm happening, took shelter, with her train, under this tree, the branches of which were sufficiently extensive to cover all. All that side of the mountain abounds with chesnut-trees. At Tortworth, in Gloucestershire, is a chesnut-tree fifty-two feet round: it is known to have stood there ever since the year 1150, when it was called the Great Chesnut of Tortworth; and is supposed to be nearly a thousand years of age. The wood of the chesnut-tree, as a substitute for oak, is preferable to elm. It was formerly much used in London for the purposes of building; but it is not to be depended upon on these occasions. It is allowed to be excellent for liquor-casks, and recommended as an underwood, for hop-poles and stakes. Its fruit is valuable for swine and deer; and, when the growth of warm climates, as food for man: it is said to have been made into bread.

FAIR, a greater kind of market, granted to a town, by privilege, for the more speedy and commodious providing of such things as the place stands in need of. It is incident to a fair, that persons shall be free from being arrested in it for any other debt contracted than what was contracted in the same; or, at least, promised to be paid there.

Fairs abroad are either free, or charged with toll and imposition. The privileges of free fairs consist chiefly, first, in that all traders, whether natives or foreigners, are allowed to enter the kingdom, and are under the royal protection, exempt from duties, tolls, &c. Secondly, that merchants, in going or returning, cannot be molested or arrested, or their goods stopped. They are established by letters-patent from the prince. Fairs, particularly free fairs, make a very considerable object in the commerce of Europe, especially that of the Mediterranean, and inland parts of Germany.

FAIRY rings. The circles of dark-green grass frequently observed in old pastures, have long been known under the name of fairy rings, and have generally been supposed to be occasioned, in some way or other, by electricity. Dr. Wollaston has, in a late volume of the Transactions of the Royal Society, given a new and very ingenious theory, of which we shall present our readers with a brief account, premising that Mr. Davy, in the course of his lectures at the Royal Institution, had occasion to refer to the subject, and seemed to coincide in opinion with Dr. Wollaston. That which first attracted his notice was the position of certain fungi which are always found growing upon these circles, if examined in a proper season. The position of these fungi led him to imagine that the progressive increase from a central point was the probable mode of formation of the ring: hence he conjectured that the soil, which had once contributed to the support of the fungi, might be so exhausted of some peculiar pabulum necessary for their production as to be rendered incapable of producing a second crop.

The second year's crop would, if this theory be just, appear in a small ring surrounding the original centre of vegetation, and at every succeeding year the defect of nutriment on one side would necessarily cause the new roots to extend themselves solely in the opposite direction, and would occasion the circle of fungi continually to proceed, by an annual enlargement, from the centre outwards. An appearance of luxuriance of the grass would follow as a natural consequence, as the soil of an interior circle would always be enriched by the decayed roots of fungi of the year's growth. This theory is supported by some observations of Dr. Withering; and Dr. Wollaston says, by way of confirmation, that whenever two adjacent circles are found to interfere, they not only do not cross each other, but both circles are invariably obliterated between the points of contact: the exhaustion occasioned by each obstructs the progress of the other, and both are starved.

FAKIR, an Indian devotee. Some of these victims of superstition even outdo the mortifications and severities of the antient Anchorites; one mangling his body with scourges and knives; another never lying down; and another remaining all his life in one posture. There are also other fakirs, who do not practise such severities: these flock together in companies, and go from village to village, prophesying and telling fortunes. It is said that persons of fortune, in India, become fakirs, and that there are more, sometimes, than two millions of this description of people.

FALCO, in ornithology, a genus of birds, of the order of the accipitres, with three toes always be-

fore and only one behind. This genus comprehends the falcon-kind, properly so called: the hawk, gyrfalcon, eagle, buzzard, kite, and others, to the number of about one hundred and thirty-six. They for the most part, are rapacious tribes, and feed on putrified carcases; yet seldom and never but when pressed by extreme hunger attack living animals, they are bold and fly with great speed when high in the air, but slowly in its lower regions; have an exquisite sense of smell, and are very quick-sighted; not gregarious, generally build in clefts of impending rocks, their nests, which are called eyries, a term, however, which merely implies a place of eggs, but a few of them make their nests on the ground.

FALCO, *chrysaëtos*, golden eagle, inhabits Europe and Siberia; flies to a vast height in serene weather, and descends against a storm. The general weight is about twelve pounds. There are two instances in Scotland of this bird having flown away with infants to its nest, yet in both the theft was discovered time enough to extricate them without essential damage; Eagles are very long-lived, many instances occurring of their existing upwards of a century; whence probably the allusion of the Psalmist. "Thy youth is renewed like the eagles." They are capable of enduring abstinence; instances having occurred of the eagles continuing for upwards of twenty days without food of any kind. See pl. Nat. Hist. fig. 17.

FALLING-star, in meteorology, a phenomenon that is frequently seen, and which has been usually supposed to depend on the electric fluid. Mr. Davy, in a lecture delivered at the Royal Institu-

tion, gave many reasons against this opinion: he conceives that they are rather to be attributed to falling stones. It is observable that when their appearance is frequent they have all the same direction; and it has been remarked that they are the forerunners of a westerly wind in our country.

FALLOWING of land, a particular method of improving land. It appears that none will find a year's fallowing a loss, let the land be what it will; but, more particularly, the advantage of fallowing consists in, 1. its laying of the land in ridges, and its exposing it to the frost, wind, sun, and dews, all which sweeten and mellow the land very much; the often stirring of it, and breaking the clots, dispose it for the bearing of good crops. 2. its killing the weeds, by turning up the roots to the sun and air, and killing not only the weeds that grew with the last corn, but wild oats, darnel, and other weeds.

FALSE imprisonment, in law. To constitute the injury of false imprisonment, two points are necessary: the detention of the person, and the unlawfulness of such detention. Every confinement of the person is imprisonment, whether in a common prison, or a private house, or even by forcibly detaining one in the streets.

FAMILIARS of the Inquisition, bailiffs who assist in apprehending the accused, and carrying them to that prison. They are called *familiars* because they belong to the inquisitor's family. Portuguese noblemen have been ambitious of filling this office; and the same plenary indulgence is granted by the Pope to every single exercise of this function, as formerly to those who succoured the Holy Land.

FARCE, was originally a droll or petty show exhibited by mountebanks and their buffoons in the open streets, to gather the people together. At present it is of more dignity : it is removed from the street to the theatre, and instead of being performed by merry-andrews to amuse the rabble, is acted by comedians, and become the entertainment of a polite audience. Poets have reformed the wildness of the primitive farces, and brought them to the taste and manner of comedy. The difference between the two on our stage is, that comedy keeps to nature and probability, and therefore is confined to certain laws prescribed by ancient critics, whereas farce disallows of all laws, or rather sets them aside on occasion. Hence the dialogue is usually low, the persons of inferior rank, the fable or action trivial or ridiculous, and nature and truth every where heightened and exaggerated to afford the more palpable ridicule.

FARINA *fecundans*, among botanists, the impregnating meal or dust on the apices or antheræ of flowers, which, being received into the pistil or seed-vessel of plants, fecundates the rudiments of the seeds in the ovary, which otherwise would decay and come to nothing. The manner of obtaining the farina of plants for microscopical observation is this : gather the flowers in the midst of a dry, sun-shiny day, when the dew is perfectly off, then gently shake off the farina, or lightly brush it off with a soft hair-pencil, upon a piece of white paper ; then take a single talc of isinglass between the nippers, and, breathing on it, apply it instantly to the farina, and the moisture of the breath will make that light powder stick to it. If too great a

quantity is found adhering to the talc, blow a little of it off ; and if there is too little, breathe upon it again, and take up more. When this is done, put the talc into the hole of a slider, and applying it to the microscope, see whether the little grains are laid as you desire, and if they are, cover them up with another talc, and fix the ring, but care must be taken that the talcs do not press upon the farina in such a manner as to alter the form.

FARM, in law, a portion of land, employed in the purposes of husbandry, and let out at a certain rent. The same thing, in various parts of Britain, is differently termed : in the north, a *tack*, or land *taken* or *hired* ; in Lancashire, a *ferme-holt*, or *farm-hold*, in contradiction with *freehold* ; in Essex, a *wike*, or *wic*, from a Saxon word, signifying a dwelling.

“ To farm,” in a general sense, is to hire at a fixed rent any post, situation, or property from which larger but unfixed profits may be obtained : thus one, agreeing to pay a certain yearly sum, in consideration of receiving the tolls at a turnpike, is said to *farm* the turnpike.

FARRERY. See **VETERINARY Science**.

FASCI, in Roman antiquity, a bundle of birchen rods, with an axe in their centre, carried before the Roman magistrates as a badge of their authority and office. The use of the *fascos* was introduced by the elder Tarquin, as a mark of sovereign authority : in after times they were borne before the consuls, but by turns only, each having his day. These latter had twelve of them, carried by so many lictors.

FASCIES, in fortification, faggots of small-wood

of about a foot diameter and six feet long, bound in the middle and at both ends. Fascines are used in raising batteries, making chandeliers, in filling up the moat to facilitate the passage to the wall, in binding the ramparts where the earth is bad, and in making parapets of trenches to screen the men. They are also sometimes pitched over, to be thrown upon the enemy's works in order to set them on fire. They differ from *saucissons*, in being made of small wood; whereas *saucissons* are made of branches of trees.

FATA Morgana, a very remarkable aerial phenomenon, which is sometimes observed from the harbour of Messina and adjacent places, at a certain height in the Atmosphere. The name, which signifies the fairy Morgana, is derived from an opinion of the superstitious Sicilians, that the whole spectacle is produced by fairies, or such-like visionary invisible beings. The populace are delighted whenever it appears, and run about the streets shouting for joy, calling every body out to partake of the glorious sight. This singular meteor has been described by various authors; but the first who mentioned it with any degree of precision was Father Angelucci, whose account is thus quoted by Mr. Swinburne in his tour through Sicily: "On the 15th of August, 1643, as I stood at my window I was surprised with a most wonderful delectable vision; the sea that washes the Sicilian shore swelled up, and became for ten miles in length like a chain of dark mountains; while the waters near our Calabrian coast grew quite smooth, and in an instant appeared as one clear polished mirror reclining against the ridge.

On this glass was depicted, in chiar-oscuro, a string of several thousand of pilastres, all equal in altitude, distance, and degree of light and shade. In a moment they lost half their height, and bent into arcades, like Roman aqueducts. A long cornice was next formed on the top, and above it rose castles innumerable, all perfectly alike. These soon split into towers, which were shortly after lost in colonnades, then windows, and at last ended in pines, cypresses, and other trees, even and similar. This is the Fata Morgana, which for twenty-six years I had thought a mere fable."

FATHER, in church history, is applied to ancient authors who have preserved in their writings the tradition of the church: thus St. Chrysostom and St. Basil are called Greek fathers, and St. Augustine and St. Ambrose, Latin fathers. No author who wrote later than the twelfth century is dignified with the title of *father*.

FAT, in anatomy, an oily matter, secreted from the blood, and filling up the cavities of the adipose cells. The uses of fat are, 1. To serve as a kind of covering to the body, in order to preserve it from cold and other injuries. 2. To defend the more tender and sensible parts from being too strongly irritated by the salts. 3. To preserve in good order the pliancy of the muscles, of the skin, and of the other parts between and about which it is placed. 4. To facilitate the motions of certain parts; as the eyes and jaws. 5. To fill up empty interstitial spaces, and by that means to add to symmetry and beauty; as is evident in the face and the neck. 6. To prevent the painful pressure and attrition of the parts, particularly in the soles of

the feet, the nates, and other like parts ; in all which the fat is copiously disposed, and serves in the place of a cushion for the muscular flesh to rest upon. 7. There is great reason to suppose, that when the body does not receive nourishment in the usual way, the regress of the fat into the veins supplies that defect.

FEALTY, in law, an oath taken on the admittance of any tenant, to be true to the lord of whom he holds his land.

This fealty, at the first creation of it, bound the tenant to fidelity, the breach of which was the loss of his fee. It has been divided into general and special : general, that which is to be performed by every subject to his prince ; and special, required only of such as, in respect of their fee, are tied by oath to their lords.

FEAST, in the English Church, a word principally used in proceedings at law : thus, the four quarterly feasts, or stated times, whereon rent on leases is usually reserved to be paid, are Lady-day, or the annunciation of the blessed virgin Mary, or 25th of March ; the nativity of St. John the Baptist, held on the 24th of June ; the feast of St. Michael the arch-angel, on the 29th of September ; and Christmas, or rather of St. Thomas the apostle, on the 21st of December.

FEASTS, *moveable*, are those which, depending on astronomical calculations, do not always return on the same days of the year. Of these, the principal is Easter, which fixes all the rest as Palm-Sunday, Good-Friday, Ash-Wednesday, Sexagesima, Ascension-day, Pentecost, and Trinity-Sunday. See **EASTER**.

FEASTS, *immoveable*, those which are constantly celebrated on the same day : of these, the principal are Christmas-day, or the Nativity ; the Circumcision ; Epiphany ; Candlemas, or the Purification ; Lady-day, or the Annunciation, All-Saints, and All-Souls, and the days of the several apostles.

FEATHER, in physiology, a general name for the covering of birds ; it being common to all the animals of this class to have their whole body, or at least the greatest part of it, covered with feathers or plumage.

Feathers make a considerable article in commerce, particularly those of the ostrich, heron, swan, peacock, turkey, goose, and duck.

They may be considered as of four kinds : 1. quills, or the feathers of the wings ; 2. those which cover the body ; 3. the down which grows close to the skin ; and, 4. the long ones of the tail.

Of the first description, the goose, the turkey, and the crow, supply those usually employed in writing. The feathers of the common poultry are used for beds ; and the down of the swan is sometimes made into muffs and other articles of dress. The eider-duck, the down of which is celebrated, is a native of the high northern latitudes : a considerable number breed in the west of Scotland, and supply the inhabitants with a profitable branch of trade ; but the larger part of the down used in Britain is brought from Denmark.

FEBRUARY, in chronology, the second month of the year, reckoning from January, first added to the calendar of Romulus by Numa Pompilius. February derived its name from Februa, a feast held by the Romans in this month, in behalf of the

manes of the deceased, at which ceremony sacrifices were performed, and the last offices were paid to the shade of the defunct. This month in a common year, consists only of twenty-eight days, but in the bissextile year it has twenty-nine, on account of the intercalary day added that year.

FEE-ESTATE, that held of another, and for which some service, rent, or acknowledgment is paid to the chief lord, or superior, in whom the ultimate propriety of the soil always continues. Fee is generally divided into absolute and conditional. Absolute, otherwise termed fee-simple, is where a person is seized of lands or tenements, to him and to his heirs for ever ; whereas, fee-tail, or conditional fee, is where a person is seized of lands, with a limitation to him and the heirs of his body. A fee-simple is the most complete estate a person can have, and can be conveyed by no other expression but that of *heirs for ever* ; yet, in a will, which is more favoured than a grant, the intention of the testator is more considered than the literal meaning of the words.

FEELING, one of the five external senses, by which we obtain the ideas of solid, hard, soft, rough, hot, cold, wet, dry, and other tangible qualities. This sense is the coarsest, but at the same time the surest of all others : it is besides the most universal. We see and hear with small portions of our body ; but we feel with all. Nature has bestowed that general sensation wherever there are nerves, and they are every where, where there is life. Were it otherwise, the parts divested of it might be destroyed without our knowledge. It seems that upon this account nature has pro-

vided, that this sensation should not require a particular organization. The structure of the nervous papillæ is not absolutely necessary to it. The lips of a fresh wound, the periosteum, and the tendons, when uncovered, are extremely sensible without them. These nervous extremities serve only to the perfection of feeling, and to diversify sensation.

Feeling is the basis of all other sensations. All the nervous solids, while animated by their fluids, have this general sensation ; but the papillæ in the skin, those of the fingers in particular, have it in a more exquisite degree, so perfectly, that they convey some notice of the figure of the bodies which they touch. The object of feeling is every body that has consistency or solidity enough to move the surface of our skin. It was necessary to perfect feeling, that the nerves should form small eminences, because they are more easily moved by the impression of bodies, than an uniform surface. It is by means of this structure, that we are enabled to distinguish not only the size and figure of bodies, their hardness and softness, but also their heat and cold. Feeling is so useful a sensation, that it supplies the office of the eyes, and in some sense indemnifies their loss.

FELIS, in natural history, a genus of the order *feræ*. This tribe is temperate in its habits ; climbs trees ; sees best by night, and when falling from a height lights on the feet : waves the tail when in sight of prey, refuses vegetable food except from necessity : it includes the Lion, Tyger, Cat, Panther, &c. The Lion inhabits Africa : more rarely the deserts of Persia, India, Japan. It preys on

horses and other larger quadrupeds, and when pressed by severe hunger, on man ; afraid of flame ; restrained by dogs ; when young is easily tamed ; roars terribly ; sleeps in the sun ; eats every day ; lazy, slow ; leaps upon its prey ; breath fetid ; smell weak. Its flesh is eaten by the Africans. The strength of the lion is prodigious ; he is able to break the back of a horse by a single stroke of his paw ; to carry off with ease a middle-sized ox or a buffalo ; and to break the bones with his teeth with perfect ease and swallow them with the flesh. His duration is uncertain. Buffon calculates it under thirty years ; but we have had lions in a state of confinement in the Tower who have lived sixty or seventy years. The *Felis Tigris* or Tyger inhabits the warmer parts of Asia, as China, Japan ; and India, lives in woods and thickets near rivers : it is cunning, cruel, strong, and of vast swiftness, infesting and even desolating the human race. When tamed from its birth, it will exercise his ferocity as soon as liberated : the male destroys his own progeny ; will at all times attack the lion, and is the most beautiful of all wild beasts. See pl. Nat. Hist. Fig. 18, 19.

FELLOWSHIP, in arithmetic, is when two or more join their stocks and trade together, dividing their gain or loss proportionably. Fellowship is either with or without time. Fellowship without time is worked by the following rule "As the whole stock, to the whole gain or loss, so is each man's particular stock to his share of gain and loss."

Example. Suppose three persons A, B, and C trade together, and A put in 240*l*. B 320*l*.

and C 400*l.* and they gain 120*l.* what is each man's profit. Say as the whole stock, or

£	£	£	£	
960	: 120	::	240	: 30=A's share.
960	: 120	::	320	: 40=B's share.
960	: 120	::	400	: 50=C's share.

£. 120—whole gains.

FELO DE-SE, in law, a person that deliberately lays violent hands on himself, and is the occasion of his untimely death, whether by hanging, drowning, stabbing, shooting or any other way. This is a species of felony, of which infants, idiots, lunatics, and persons distracted by a disease, cannot be guilty, it being the wilful and deliberate perpetration of self-murder that constitutes this crime. The goods and chattels, both real and personal, of a *felo-de-se*, are forfeited to the king: however, the jury frequently save the forfeiture; by finding their verdict lunacy; to which they are inclined on a favourable interpretation, that it is impossible for a person in his senses to do a thing so contrary to nature.

FELONY, in law a capital crime, next in degree to petit-treason, and committed with an evil intention. Felony is either by the common law, the civil law, or by statute. Felony at common law, is either against the life of a person, as murder, manslaughter, *felo-de-se*, and *se-defendendo*; against his goods, as larceny, and robbery; against his habitation, as burglary, arson, and house-breaking; or, lastly, against public justice, by breach of prison, rescue, and escape, &c. Piracy, and robbery and

murder on the sea, is felony both by the civil law, and by statute.

There are usually reckoned two sorts of felony, one lighter, and such as for the first offence may be allowed benefit of clergy; which the other, or greater may not. See BENEFIT and CLERGY.

Felony is punishable with loss of life, and of lands not intailed, as also of goods and chattels. It also corrupts blood, unless the statute, making an offence to be felony, ordains it otherwise.

FELTING, the method of working up hair, or wool into a species of cloth, independently of either spinning or weaving. A hatter separates the hairs from each other by striking the wool with the string of his bow, causing them to spring up in the air, which fall on the table in every direction, which is covered by the workman with cloth, pressing it with his hands, and moving the hairs backwards and forwards in different directions. In this manner the hairs are brought against each other, and their points of contact considerably multiplied, and the agitation gives each hair a progressive motion towards the root, in consequence of which the hairs become twisted together. As the mass becomes compact, the pressure should be increased, in order to keep up the progressive motion and twisting of the hairs, which is then performed with greater difficulty. The hair intended for the manufacturing of hats is always cut off with a sharp instrument, and not pulled out by the roots, because the bulb of the hair, which would come out with it in the latter case, would render the end which was fixed in the skin very obtuse, and nearly destroy its disposition to unite with the adjacent hairs. The

hair should not be straight like needles, for then there would be no compactness in the stuff. The fibres of wool having naturally a crooked form, that substance is well adapted to the operation of felting. The hair of beavers, rabbits, hares, &c. being straight, cannot be used in felting, till it has been prepared for the purpose.

FELUCCA, in nautical affairs, a little vessel with six oars, frequent in the Mediterranean, which has this peculiarity, that its helm may be applied either to the head or stern, as occasion requires.

FENCING, the art of making a proper use of the sword, as well for attacking an enemy, as for defending one's self. Fencing is either simple or compound. Simple is that performed nimbly and off hand, on the same line. In this the principal intention, in respect to the offensive part, should be to attack the enemy in the most unguarded part; and in the defensive, to parry or ward off the enemy's thrusts and blows. Compound fencing, on the offensive part, includes all manner of arts to deceive the enemy, by making him leave the part unguarded which we want to attack; such are feints, appeals, clashing and intangling of swords, half-thrusts, &c. and on the defensive, to parry and thrust at the same time.

FEODAL, or FEUDAL SYSTEM, a form of government antiently subsisting in Europe; which still forms the basis of modern customs, and with which every Briton, who would understand the history of his country, the origin of its political constitution, the tenure of its landed property, and the general basis of its polity, should make himself acquainted.

The word *feud*, is thus derived: We are informed

by Pontoppidan, that *odh*, in the Northern languages, is the same with *proprietas*, and *all* with *totum* in the Latin; whence the word *odhall* signifies *right*. By transposing these two syllables the word *allodh* is formed, from which comes *allodium*, or the *absolute* property claimed by the holders of fiefs or feods; and by the combination of *odh*, signifying *property*, with the word *fee*, signifying *a conditional stipend or reward*, is produced the word *feodh*, "a property given by way of stipend or reward upon certain conditions."

With respect to the origin of this system, we are told that it is to be found in the military policy of the *Celtic* or northern nations, known by the names of *Goths*, *Vandals*, *Franks*, *Huns*, and *Lombards*, who overran Europe on the declension of the Roman Empire, and brought it with them from the countries out of which they emigrated.

According to the feudal scheme, a victorious leader allotted considerable portions of land, called *feoda*, *fiefs*, *fees*, or *feuds*, to his principal officers, who in their turn, divided their possessions among their inferiors. The condition upon which these rewards were given was, that of faithful military service both at home and abroad. This the receiver bound himself by the oath of fealty to perform, and in the event of a breach of that oath, the lands returned to the donor.

Such was the foundation of a system of government the most brilliant in theory that it is possible to conceive; and one that in the times, and under the circumstances, of its erection, was it is reasonable to believe, not only the most expedient, but the most desirable to all parties. It laid down a gra-

dated scale from the lowest vassal to the prince or lord paramount of the territory ; every man's interest was involved in the security of the whole ; and every man was a pledge of security to his neighbour. In the midst of that disinterestedness of sentiment which belongs to a rude state of society, the connection of the lord and his vassal was of the most admirable nature ; and, as is the end of all social combinations, each individual contributed to support that strength by which he was protected. It was in these days that those *feodal incidents*, or as they have since been termed, *rights*, originated, which in subsequent times, became notoriously oppressive.

The expectants of fiefs, while the tenures were precarious, or for life only, were educated in the hall of the superior ; and even when they became hereditary, the lord took care of the son and estate of his deceased vassal : not only protecting his person, but taking charge of his tuition, and directing the management of his affairs. This was called the incident of *wardship*.

The incident of *relief* was founded upon the gratitude, or at most the voluntary offering, of the vassal, who, on receiving his fief, brought a present to his lord, as an acknowledgment of the favours experienced, and with a view to the conciliation of his future regard.

The incident of *marriage* was also of the same patriarchal nature. The vassal forebore to ally himself with a family inimical to his chief, and the chief sought the most advantageous match for his vassal.

It sometimes happened, through war, or other

accidents, that the chief himself was reduced to poverty: but from whatever cause his distress proceeded, whether from his extravagance or prodigality, his vassals were bound to support and relieve him according to their means; and this was called the incident of *aid*.

The incident of *exchange* took place on the part of the vassal, when, through cowardice, treachery, or other misconduct, he rendered himself unworthy of his fief; when the taking it from such a one, and giving it to another more deserving, was called an *exchange*.

Without having lived in the days to which we are now looking back, a very small portion of the knowledge of human nature will be sufficient to convince us that the theory itself, as a permanent institution, however fair-seeming, is hollow; that the family connection it supposes could be but a source of minute, domestic tyranny; and that in their best period, the customs enumerated must have been liable to the grossest abuse. In process of time, the evil increased to an enormous height; and even the political value of the system decayed. In its vigour, it had at least constituted a regular, powerful, and compact system of government; a unanimity had pervaded the various departments of the state; and while the power was internally diffused, it presented to foreign nations a united and formidable front. As the ideas engendered by property advanced, and the great grew more avaricious of money than of glory; and when, it ought perhaps to be added, man's notions of right and order became more correct, nothing was heard of but the enormities of the powerful, and the sufferings of

the weak. In this situation of things, the form of the system indeed remained; but its spirit was gone: the vassals still followed their chiefs to the field, because by neglecting to do so they had forfeited their lands; but when there, they as often contributed to his overthrow as to his advantage.

The feudal governments, therefore, once so strong, were now weak and unmanageable; and, in remedy, knight-service was introduced. This event happened about the year 800; and from that epoch is to be dated the extinction of the feudal system in its pure and unmixed character: it was blended, however, with the system of knight-service, as both the one and the other, in after times, gave birth to, and blended themselves with, the British parliament.

The conqueror divided England into 60,815 fiefs, all held of the crown; and the possessors of which were to take up arms and repair to his standard on the first signal.

FERRÉ, in natural history, an order of quadrupeds, of which the distinguishing characteristics are that they usually have six conic fore-teeth in each jaw; long tusks, and grinders with conical projections: they feed on carcases, and prey on other animals. This order comprehends the canis, the felis, the ursus, and seven other genera.

FERRÉ NATURE, in law, signifies beasts and birds that are wild, as foxes, hares, and wild-ducks, in which no person can claim any property.

FERMENTATION. The word fermentation, in general, is used to denote that change in the principles of organic bodies which begins to take place spontaneously as soon as their vital functions have

ceased, and by them are at length reduced to their first principles. This has been distinguished into three stages, the vinous or spirituous, the acid or acetous, and the putrid fermentation. It is ascertained almost beyond doubt, that the vinous fermentation takes place only in such bodies as contain saccharine juices. In this the most remarkable product is a volatile, colourless, slight inflammable fluid, which mixes with water in all proportions, and is called alcohol, which see. The acetous fermentation is distinguished by the product known by the name of vinegar, which is the least destructible of the vegetable acids. It does not appear, however, that fermentation is absolutely necessary for the production of this acid, as there are many other chemical processes by which it may be obtained or produced. In the putrid fermentation, bodies appear to be reduced into their most simple parts. Ammonia is the product which has been remarked as the chief of this process, and is no doubt produced by the combination of the hydrogen and nitrogen gasses, which are disengaged together. See AMMONIA.

OF FIBRIN. If a quantity of blood, newly drawn from an animal, be allowed to remain at rest for some time, a thick red clot gradually forms in it, and subsides. Separate this clot from the rest of the blood, put it into a linen cloth, and wash it repeatedly in water till it ceases to give out any colour or taste to the liquid; the substance which remains after this process is denominated fibrin. It has been long known to physicians under the name of the fibrous part of the blood; but has not till

lately been accurately described. It may be procured also from the muscles or flesh of animals.

FIERI FACIAS, in law, a writ that lies where a person has recovered judgment for debt or damages in the king's courts against one, by which the sheriff is commanded to levy the debt and damages on the defendant's goods and chattels. This writ must be sued out within a year and a day after the judgment obtained.

FIFTEENTH, an ancient tribute or tax laid upon cities, boroughs, &c. through all England, and so termed because it amounted to a fifteenth part of what each city or town had been valued at; or it was a fifteenth of every man's personal estate according to a reasonable valuation. In doomsday-book, there are certain rates mentioned for levying this tribute yearly.

FIG, the fruit of the fig-tree, the best of which is produced in Italy, Spain, and Provence. The islands of the Archipelago have figs in great abundance, but of inferior quality. See **CAPRIFICATION**.

FIGURE, in rhetoric, is a manner of speaking different from the ordinary and plain way, and more emphatical; expressing a passion, or containing a beauty. Figures are highly serviceable to clear difficult truths, to make a style pleasant and pathetic, and to awaken and fix attention; but as, in order to obtain these ends, they are to be used with prudence and caution, the following directions ought to be observed. 1. Let the discourse always be founded on nature and sense, supported with strong reason and proof, and then add the ornaments and heightenings of figures; for a man of clear understanding will despise the flourish of figures without

sense, and pomp of words that wants truth and substance of things. 2. Be sparing in the use of figures. A passion described in a multitude of words, and carried on to a disproportionate length, fails of the end proposed, and tires instead of pleasing. 3. Figures must not be over adorned, nor affectedly laboured, and ranged into new and scrupulous periods; for by affectation and show of art, the orator betrays and exposes himself, and it is apparent, that he is rather ambitious to set off his parts and wit, than to express his sincere concern and passion.

FILAMENT, in natural history, a fibre or fine thread in flesh, nerves, skin, plants, and roots, and other substances. Putrefaction destroys the pulpy or fleshy matter, and leaves the tough filaments entire: thus, by putrifying the leaf of a plant in water, the fibres, which constitute the basis of the ribs and minute veins, are obtained complete. Alkaline lixivia in some degree operate in a manner similar to putrefaction. Vegetable filaments are the materials of many manufactures. In Britain, the filamentous parts of hemp, flax, and cotton are worked into cloths; in Madagascar, slight cloths of a softness approaching to silk, and others of a coarser and very durable texture, as well as sail-cloth and cordage, are made from the bark of certain species of trees. In France, the filaments of nettles are applied to the same variety of purposes; and it has been suggested that the muslins and calicoes of India are made from the same plant. In Sweden, a strong cloth is said to be made of the stalk of the hop. In Otaheite, cloth is made from the bark of trees.

FILARIA, a genus of the class vermes, and order intestina : the most destructive is the *Filaria medinensis*, or Guinea-worm ; which inhabits both Indies, and is frequent in the morning dew, whence it enters the naked feet of the slaves, and creates the most troublesome itching, accompanied with inflammation and fever. It is frequently from eight to ten feet in length, and not larger than a horse-hair,

FILAZAR, or **FILACER**, an officer of the common-pleas, so called from his filing those writs whereon he makes out processes. There are fourteen of these officers, who are severally allotted to particular divisions and counties, and make out all writs and processes upon original writs, issuing out of the court of chancery; and returnable in that court.

FILLAGREE-work, a delicate and elaborate manufacture, primarily executed in threads of gold and silver, but lately imitated with coloured and gilt paper. There is no manufacture in any part of the world that has been more admired and celebrated than the fillagree of Sumatra, of which a minute history is given in Marsden's account of that island. The work usually executed by young ladies in this country under the title of fillagree, and of which caddies, vases, &c. are constructed, is formed of narrow slips of coloured paper, or gilt at the edges, and curiously rolled up and glued in various fanciful forms. The Chinese also make fillagree mostly of silver, which looks elegant, but wants likewise the extraordinary delicacy of the Malay work. The price of the workmanship depends upon the difficulty or uncommonness of the pattern. In some articles of usual demand, it does not exceed

one third of the value of the gold ; but in matters of fancy, it is generally equal to it.

FILES, *manufactory of.* Many useful tools have been invented for performing mechanical operations, which consist of a number of wedges or teeth, which may be conceived to stand upon, or rise out of a flat or curved metallic surface. When these teeth are formed upon the edge of a plate, the instrument is called a saw ; but when they are formed upon a broad surface, it constitutes what is known by the name of a file. The comb-makers and others use a tool of this description, called a quonet, having coarse single teeth, to the number of about seven or eight in an inch. Fine-tools of the same kind, namely, with single teeth, are called floats. When the teeth are crossed, they are called files ; and when instead of the notches standing in a right line, a number of single individual teeth are raised all over the surface, it is called a rasp.

FILTER, in chemistry, a strainer commonly made of bibulous or filtering paper in the form of a funnel, through which any fluid is passed, in order to separate the gross particles from it, and render it limpid. There are several filters made of flannel and linen cloth. The filter produces the same effect, with regard to liquids, that the sieve does in dry matters. Filters are of two sorts : the first are simple pieces of paper or cloth, through which the liquor is passed without farther trouble ; the second are twisted up like a skein or wick, and first wetted, and then squeezed as dry as possible ; one end is put into the liquor to be filtrated, the other end is to hang out below the surface of the liquor ; by this

means the purest part of the liquor distils drop by drop out of the vessel, leaving the dregs behind; a filter of this kind acts upon the principle of the syphon. Water is freed from various impurities by means of basins made of porous stone; this is often very necessary at sea, when the water becomes foul, and on land, where there are no fresh springs. The filter is of use to all those in and near the metropolis, who are supplied with water from the Thames; the New River, and the ponds from Hampstead. Many patents have been obtained for filtering machines, which may be seen in various parts of London.

FINANCES, in political economy, denote the revenue of a king or state. In former times, when the whole revenue drawn from the people, by a few taxes, was considered as the personal property of the sovereign, the purposes to which it was applied, depended on his discretion, or that of his minister. As few princes were inclined, in times of peace, to provide for the extraordinary charges of a state of warfare, these were defrayed by extraordinary contributions from the people, which ceased with the occasion. Few sovereigns possessed sufficient credit, either with their own subjects or foreigners, to contract debts, so that at the conclusion of a war, there was no occasion for a greater expenditure than before its commencement, and the revenue drawn from the people reverted to its former state. It is the system of defraying extraordinary expences by borrowing the money, for which an annual interest must be paid; and of suffering the debts thus incurred to accumulate, by which the sum to be annually paid is continually increasing,

And the expences of every war are rendered far greater than those which preceded it, that has swelled the revenue and expenditure of most of the nations of Europe to an enormous magnitude, and caused their system of finance to become complicated and oppressive.

In Great Britain, where the system of running in debt, or, as it is commonly termed, the funding system, has been carried to a greater height than in any other country, its natural attendants, enormous taxation and, expenditure, have made equal progress; and it is probably owing chiefly to the publicity which is given to all matters of finance, so that every person, with little trouble, may know how all the money raised for the public service is expended, that the people have been induced to submit to taxes, which both from their nature and amount would have appeared incredible to their forefathers.

The English system of finance rests on the produce of the various taxes which have been imposed at different periods, the aggregate amount of which, after deducting the expences of collection, together with a few small articles which cannot properly be called taxes, forms the whole of the public income: this income is annually appropriated to the several branches of the national expenditure, and when, in consequence of any extraordinary expences, it is known that the income of the current year will be insufficient to meet all the demands upon it, it is usual to borrow the sum necessary to make up the deficiency, either from individuals or public bodies, and to allow a fixed rate of interest on the money thus obtained, till the principal shall be repaid, or

all the period originally agreed upon shall have expired.

FINE, in law, a term that has several significations. Sometimes it means a sum of money advanced and paid for the income of lands; at others, a sum paid as an amends, or by way of punishment, for an offence committed.

FINE also denotes a covenant, made before justices, and entered upon record, for conveyances of lands and other inheritable things, in order to cut off all controversies. As this fine is a concord acknowledged before a competent judge concerning lands, tenements, and other immoveable things, and for its better credit, is supposed (as levied in his court) to be made in the presence of the king, it binds women covert, who are parties, and others whom the law generally disables to act: because all presumption of deceit is excluded, where the king and his court of justice are privy to the matter transacted. Fines on account of their solemnity, are acknowledged in the court of common-pleas. Justices of assise may also take them, though they seldom do it without a special writ, by virtue of which fines may be also taken by commissioners in the country, under the surmise that the parties are not able to travel to Westminster: for, by the common law, all fines are levied in court.

FINGERS, in anatomy, the extreme part of the hand divided into five members. The names of the fingers, reckoning from the thumb, are, 1. *pollex*, 2. *index*, 3. *medius*, 4. *annularis*, 5. *auricularis*. In each of these there are three bones, which make three phalanges, the upper of which are much larger than the lower. Their exterior surface is

convex, and their interior plane, but somewhat hollowed, for the convenience of grasping.

Fig. See CALORIC.

The properties of caloric are four in number : 1. it causes expansion ; 2. it causes fluidity ; 3. it causes evaporation ; 4. it causes combustion.

1. When caloric enters into the pores of bodies, that is, when, according to the usual expression, bodies become hot, they expand in every direction in a degree proportionate to the quantity of caloric they contain.

Different bodies, however, expand in different proportions ; that is, their fitness, to imbibе caloric is different. This part of the subject belongs to the *attraction of combination* ; according to which the very bodies are said to have more or less *affinity* for caloric.

2. The second effect of the presence of caloric is that of rendering solid bodies fluid. Ice is the state of water while it contains only a very small portion of caloric ; but the particles of this body have so strong an affinity or attraction for caloric, that it is perpetually ready to become fluid by the accession of that body. The phenomena of expansion and fluidity result from the same operation of caloric ; that of entering into the pores of bodies, separating their particles, and, by the addition of its own bulk, necessarily increasing their's.

3. As by the application of heat or fire solid bodies are expanded ; so by a continuation and increase of it their particles are dissolved and rendered fluid : and if heat continue to be accumulated, what was before a common or incompressible fluid, will become an elastic fluid. In common language,

it will *boil*, and in process of time dissipate in vapour.

4. Combustion, or the act of *consuming*, implies the emission of fire from some body in which it existed in a latent state, and the destruction, or rather change of some other body. Fire is contained in the largest quantity in air: and the pure part of it, that is, oxygen, being disposed to unite with many other matters, most of the ordinary processes of combustion and inflammation are the result of the sudden union of oxygen with some other substance, in which case the fire which was contained in the oxygen of the air is disengaged and let loose.

FIRE-ship, in the navy, a vessel charged with artificial fire-works, which, having the wind of an enemy's ship, grapples her, and sets her on fire.

FIRMAMENT, in the Ptolemaic astronomy, the eighth heaven or sphere, with respect to the seven spheres of the planets which it surrounds. It is supposed to have two motions; a diurnal motion, given to it by the *primum mobile*, from east to west about the poles of the ecliptic; and another opposite motion from west to east, which last it finishes, according to Tycho, in 25,412 years; according to Ptolemy, in 36,000; and according to Copernicus, in 25,800; in which time the fixed stars return to the same points in which they were at the beginning. This period is commonly called the *Platonic year*, or the *great year*.

FIRST-FRUIT, in the church of England, are the profits of every spiritual benefice for the first year, according to the valuation thereof in the king's books.

FISC, in the civil law, the treasury of a prince.

It differs from the *erarium*, which was the treasury of the public or people : thus, when the money arising from the sale of condemned persons' goods, was appropriated for the use of the public, their goods were said to be *publicari* ; but when it was destined for the support of the prince, they were called *confiscari*.

FISH, in natural history, constitutes a class of animals which have no feet, but always fins ; add to this, that their body is either altogether naked or only covered with scales ; and that they are aquatic animals, which live mostly, if not always, in water. See **ICHTHYOLOGY**.

FISHES, in heraldry, are the emblems of silence and watchfulness, and are borne either upright, imbowed, extended, endorsed, respecting each other, surmounting one another, fretted.

FISHERY, a place where fish are caught in great abundance. The principal fisheries for salmon, herring, mackrel, pilchards, &c. are along the coasts of England, Scotland, and Ireland ; for cod, on the banks of Newfoundland ; for whales, about Greenland ; and for pearls, in the East and West Indies.

FISHERY denotes also the commerce of fish, more particularly the catching them for sale.

Frsutry, Anchovy. Anchovies are fished for on the coast of Provence, in the months of May, June, and July, at which season shoals of this fish regularly come into the Mediterranean through the straits of Gibraltar. They are likewise found in plenty in the river of Genoa, on the coast of Sicily, and on that of the island of Gorgone opposite to Leghorn ; these last are reckoned the best. An-

anchovies are seldom fished for but in the night time. If a fire be kindled on the poops of the vessels used for this fishing, the anchovies will come in greater numbers into the nets; but then it is asserted, that the anchovies taken thus by fire, are neither so good nor so firm, and will not keep so well, as those which are taken without fire. When the fishery is over, they pull off the heads of all the anchovies, gut them, and afterwards range them in barrels of different weights, the largest of which do not weigh above 25 or 26 pounds, and they put a good deal of salt in them. Some also pickle them in small earthen pots made on purpose, of two or three pounds weight, more or less, which they cover with plaster to keep them the better.

FISHERY, Cod. There are two kinds of cod-fish, the one green or white cod, and the other dried or cured cod, though both are the same fish differently prepared, the former being sometimes salted and barrelled, then taken out for use, and the latter having lain some competent time in salt, dried in the sun or smoke. We shall therefore speak of each of these apart; and first of the

FISHERY, Green cod. The chief fisheries for green cod are in the bay of Canada, on the great bank of Newfoundland, on the isle of St. Petre, and the isle of Sable, to which places vessels resort from divers parts both of Europe and America. The most essential part of the fishery, is to have a master who knows how to cut up the cod; one who is skilled to take the head off properly, and, above all, a good salter, on which the preserving them, and consequently the success of the voyage, depends. The best season is from the beginning of

February to the end of April; the fish, which in the winter retire to the deepest water, coming then on the banks, and fattening extremely. What is caught from March to June keeps well, but those taken in July, August, and September, when it is warm on the banks, are apt to spoil soon. Every fisher takes but one at a time: the most expert will take from 350 to 400 in a day; but that is the most, the weight of the fish, and the great coldness on the bank, fatiguing very much. As soon as the cod are taken, the head is taken off; they are opened, gutted and salted, and the salter stows them in the bottom of the hold, head to tail, in beds a fathom or two square; laying layers of salt and fish alternately, but never mixing fish caught on different days. When they have lain thus three or four days to drain off the water, they are replaced in another part of the ship, and salted again; where they remain till the vessel is loaded. Sometimes they are cut in thick pieces, and put up in barrels for the convenience of carriage.

FISHERY, dry cod. The principal fishery for dry cod, is from cape Rose to the bay des Exports, along the coast of Placentia, in which compass there are divers commodious ports for the fish to be dried in. These, though of the same kind with the fresh cod, are much smaller, and therefore fitter to keep, as the salt penetrates more easily into them. The fishery of both is much alike, only this latter is more expensive, as it takes up more time, and employs more hands, and yet scarce half so much salt is spent in this as in the other. The bait is herrings, of which great quantities are taken on the coast of Placentia. When several vessels

meat and intend to fish in the same port; he whose shallow first touches ground, becomes intitled to the quality and privileges of admiral: he has the choice of his station, and the refusal of all the wood on the coast at his arrival. As fast as the masters arrive, they unrig all their vessels, leaving nothing but the shrouds to sustain the masts, and in the mean time the mates provide a tent on shore, covered with branches of trees, and sails over them, with a scaffold of great trunks of pines, twelve, fifteen, sixteen, and often twenty feet high, commonly from forty to sixty feet long, and about one third as much in breadth. While the scaffold is preparing, the crew are fishing, and as fast as they catch they bring their fish aboard, open and salt them upon moveable benches; but the main salting is performed on the scaffold. When the fish have taken salt, they wash and hang them to drain on sails; when drained, they are laid on kinds of stages, which are small pieces of wood laid across, and covered with branches of trees having the leaves stripped off, for the passage of the air. On these stages they are disposed, as fish think, head against tail, with the back uppermost, and are turned carefully, four times every twenty-four hours. When they begin to dry, they are laid in heaps ten or twelve thick, in order to retain their warmth; and every day the heaps are enlarged, till they become double their bulk; and then two heaps are joined together, which they turn every day as before; lastly, they are salted again, beginning with those first salted, and being laid in huge piles, they remain in that situation till they are carried on board the ships, where they are laid

on the branches of trees disposed for that purpose, upon the ballast, and round the ship, with mats to prevent their contracting any moisture.

There are four kinds of commodities drawn from cod, viz. the sound, the tongues, the roes, and the oil extracted from the liver. The first is salted at the fishery, together with the fish, and put up in barrels of from 6 to 700 pounds. The tongues are done in like manner, and brought in barrels from 4 to 500 pounds. The roes are also salted in barrels, and serve to cast into the sea to draw fish together, and particularly pilehards. The oil comes in barrels, from 400 to 520 pounds, and is used in dressing leather. The Scots catch a small kind of cod on the coast of Buchan, and all along the Murray Firth on both sides; as also in the Firth of Forth, Clyde, &c. which is much esteemed. They salt and dry them in the sun upon rocks; and sometimes in the chimney. They also cure sknit, and other small fish in the same manner, but most of these are for home-consumption.

FISHING, Herring. Herrings are chiefly found in the North Sea. They are a fish of passage, and commonly go in shoals, being very fond of following fire or light, and in their passage they resemble a kind of lightning. About the beginning of June, an incredible shoal of herrings, probably much larger than the land of Great Britain and Ireland, come from the north on the surface of the sea: their approach is known by the hovering of sea-fowl in expectation of prey, and by the smoothness of the water.

FISHING, Mackerel. The mackerel are found in large shoals in the ocean, but especially on the

French and English coasts. They enter the English channel in April, and proceeding as the summer advances; about June, they are on the coasts of Cornwall, Sussex, Normandy, Picardy, &c. where the fishery is most considerable. They are taken either with a line or nets: the latter is preferable; and is usually performed in the night-time. They are pickled two ways, first by opening and gutting them, and cramming their bellies as hard as possible with salt, by means of a stick, and then laying them in rows at the bottom of the vessel, strewing salt between each layer. The second way is putting them directly into tubs full of brine, made of salt and fresh water, and leaving them to steep till they have taken salt enough to keep. After this, they are barrelled up and pressed close down.

FISHERY, Pilchard. The chief pilchard fisheries are along the coasts of Dalmatia, on the coast of Bretagne, and along the coasts of Cornwall and Devonshire. That of Dalmatia is very plentiful: that on the coasts of Bretagne employs annually about 800 ships. The pilchards caught on our coasts, though bigger, are not so much valued as those on the coasts of France, owing principally to their not being so thoroughly cured. They naturally follow the light, which contributes much to the facility of the fishery: the season is from June to September. On the coasts of France they make use of the roes of the cod-fish, as a bait, which thrown into the sea makes them rise from the bottom, and run into the nets. On our coasts there are persons posted ashore, who, spying by the colour of the water where the shoals are, make signs to the boats to go among them to cast their nets. When taken, they

are brought on shore to a warehouse, where they are laid up in broad piles, supported with backs and sides; and as they are piled, they salt them with bay salt, in which lying, to soak twenty or thirty days, they run out a deal of blood, with dirty pickle and bittern: then they wash them clean in sea-water, and when dry, barrel and press them hard down to squeeze out the oil, which issues out at a hole in the bottom of the cask. The Cornish men observe of the pilchard, that it is the least fish in size, most in number, and greatest for gain, of any they take out of the sea.

FISHERY, Salmon. The chief salmon fisheries in Europe are in England, Scotland, and Ireland, in the rivers, and sea-coasts adjoining to the river mouths. Those most distinguished for salmon in Scotland, are the river Tweed, the Clyde, the Tay, the Dee, the Don, the Spey, the Ness, the Bawley, &c. in most of which it is very common about the height of summer, especially if the weather happens to be very hot, to catch four or five score of salmon at a draught. The chief rivers in England for salmon are the Tyne, the Trent, the Severn, and the Thames. The fishing usually begins about January, and in Scotland they are obliged to cease about the 15th of August, because, as it is then supposed the fish come up to spawn, it would be depopulating the rivers to continue fishing any longer. It is performed with nets, and sometimes with a kind of locks or weirs made on purpose, which in certain places have iron or wooden grates so disposed, in an angle, that being impelled by any force in a contrary direction to the course of the river, they may give way and open a little.

at the point of contact, and immediately shut again, closing the angle. The salmon, therefore, coming up into the rivers, are admitted into these grates, which open, and suffer them to pass through, but shut again, and prevent their return. Salmon are also caught with a spear, which they dart into them, when they see them swimming near the surface of the water. It is customary likewise to catch them with a candle and lanthorn, or wisp of straw set on fire; for the fish naturally following the light, are struck with the spear, or taken in a net spread for that purpose, and lifted with a sudden jerk from the bottom. When the salmon are taken, the method of curing is this, they open them along the back, take out the entrails and gills and cut out the greatest part of the bones, endeavouring to make the inside as smooth as possible, then salt the fish in large tubs, for the purpose, where they lie a considerable time soaking in brine, and about October they are packed close up in barrels, and sent to London, or exported up the Mediterranean. They have also, in Scotland, a great deal of salmon salted in the common way, which, after soaking in brine a competent time, is well pressed, and then dried in smoke: this is called kipper, and is chiefly made for home consumption, and, if properly cured and prepared, is reckoned very delicious.

FISHERY, Sturgeon. The greatest sturgeon-fishery is in the mouth of the Volga, on the Caspian Sea, where the Muscovites employ a great number of hands, and catch them in a kind of inclosure formed by large stakes, representing the letter Z, repeated several times. These fisheries are open on the side next the sea, and close on the other

by which means the fish, ascending in its season up the river, is embarrassed in these narrow angular retreats, and so is easily killed with a harping-iron. Sturgeons, when fresh, eat deliciously, and in order to make them keep, they are salted or pickled in large pieces, and put up in cags from thirty to fifty pounds. The great object of this fishery is the roe, of which the Muscovites are extremely fond, and of which is made the caviare or kavia, so much esteemed by the Italians.

FISHERY, Whale. Whales are chiefly caught in the North sea: the largest sort are found about Greenland, or Spitzbergen. At the first discovery of this country, whales not being used to be disturbed, frequently came into the very bays, and were accordingly killed almost close to the shore, so that the blubber being cut off was immediately boiled into oil on the spot. The ships in those times took in nothing but the pure oil and the fins, and all the business was executed in the country, by which means a ship could bring home the product of many more whales than she can according to the present method of conducting this trade. The fishery also was then so plentiful, that they were obliged sometimes to send other ships to fetch off the oil they had made, the quantity being more than the fishing ships could bring away. Time however, and change of circumstances, have effected that alteration in the concern which in every similar case it is reasonable to expect. The ships coming in such numbers from Holland, Denmark, Hamburg, and other Northern countries, in addition to the English, who were the first discoverers of Greenland, the whales disturbed, and

gradually, as fish often do, forsaking the place, were not to be killed so near the shore as before; but are now found, and have been so ever since, in the openings and spaces among the ice, where they have deep water, and where they go sometimes a great many leagues from the shore.

The whale fishery begins in May, and continues all June and July; and whether the ships have good or bad success, they must come away and get clear of the ice by the end of August; so that in the month of September, at farthest, they may be expected home: but a ship that meets with a fortunate and early fishery in May, may return in June or July.

The manner of taking whales at present is as follows. As soon as the fishermen hear the whale below, they cry out *fall! fall!* and every ship gets out its long-boat, in each of which there are six or seven men: they row till they come pretty near the whale, then the harpooner strikes it with the harpoon. This requires great dexterity, for through the bone of his head there is no striking, but near his spout there is a soft piece of flesh; into which the iron sinks with ease. As soon as he is struck, they take care to give him rope enough; otherwise, when he goes down, as he frequently does, he would inevitably sink the boat: this rope he draws with such violence, that if it were not well watered, it would, by its friction against the sides of the boat, be soon set on fire. The line fastened to the harpoon is six or seven fathoms long, and is called the *forerunner*: it is made of the finest and softest hemp, that it may slip the *codier*: to this they join a heap of lines of 90 or 100

fathoms each, and when there are not enough in one long-boat, they borrow from another. The man at the helm observes which way the rope goes, and steers the boat accordingly, that it may run exactly out before; for the whale runs away with the line with so much rapidity, that he would over-set the boat, if it were not kept straight. When the whale is stuck, the other long-boats row before, and observe which way the line stands, and sometimes pull it: if they feel it stiff, it is a sign the whale still pulls in strength; but if it hangs loose and the boat lies equally high before and behind upon the water, they pull it in gently, but take care to coil it so, that the whale may have it again easily if he recovers strength: they take care however, not to give him too much line, because he sometimes entangles it about a rock, and pulls out the harpoon. The fat whales do not sink as soon as dead, but the lean ones do, and come up some days afterwards. As long as they see whales, they lose no time in cutting up what they have taken, but keep fishing for others: when they see no more, or have taken enough, they begin with taking off the fat and whiskers in the following manner. The whale being lashed along side, they lay it on one side, and put two ropes, one at the head, and the other in the place of the tail, which together with the fins, is struck off, as soon as he is taken, to keep these extremities above water. On the off side of the whale are two boats to receive the pieces of fat, utensils, and men that might otherwise fall into the water on that side. These precautions being taken, three or four men, with irons at their feet, to prevent slipping, get on the

whale, and begin to cut out pieces of about three feet thick, and eight long, which are hauled up at the capstan or windlass. When the fat is all got off, they cut off the whiskers of the upper jaw with an ax. Before they cut, they are all lashed to keep them firm, which also facilitates the cutting, and prevents them from falling in the sea. When on board, five or six of them are bundled together, and properly stowed, and after all is got off, the carcass is turned adrift, and devoured by the bears, who are very fond of it. In proportion as the large pieces of fat are cut off, the rest of the crew are employed in slicing them smaller, and picking out all the lean. When this is prepared, they stow it under the deck, where it lies till the fat of all the whales is on board, then cutting it still smaller, they put it up in tubs in the hold, cramming them very full and close. Nothing now remains but to sail homewards, where the fat is to be boiled and melted down into train oil.

Besides these fisheries, there are several others both on the coasts of Great Britain and in the North Seas, which, although not much the subject of merchandize, nevertheless employ great numbers both of ships and men; as, 1. The oyster fishing at Colchester, Feversham, the Isle of Wight, in the Swales of the Medway, and in all the creeks between Southampton and Chichester, whence they are carried to be fed in pits about Wevenhoe, and other places.

2. The lobster fishing all along the British channel, the Firth of Edinburgh, on the coast of Northumberland, and on the coast of Norway, whence great quantities are brought to London; and, last-

ly, the fishing of the pot-ash, fin-fish, sea-unicorn, sea-horse, and the seal or dog-fish, all which are found in the same seas with the whales, and yield blubber in a certain degree; besides, the horn of the unicorn is as estimable as ivory, and the skins of the seals are particularly useful to trunk-makers.

FISHING, in general, the art of catching fish, whether by means of nets, or of spears, lines, rods, and hooks. By several statutes it is provided, that no persons shall fish in any pond or moat, without the owner's consent, on pain of three months imprisonment; nor shall any one take fish in a river without licence obtained from the owner, upon forfeiture of 10s. to the poor, and triple damages to the party aggrieved, to be levied by justices of the peace, by distress and sale of goods. The nets, and other implements, belonging to poachers, may be seized by the owners of rivers, &c. Fishing performed by a rod, line, and hook, is called angling. See ANGLING.

FITS of easy reflection, &c. in optics. Sir Isaac Newton calls the successive disposition of a ray to be reflected through different thicknesses of a plate of air, or any other substance, the returns or fits of easy reflection, and the disposition of the same ray to be transmitted in the same manner through the intervening spaces, returns or fits of easy transmission. Thus, a ray of light is in a fit of easy reflection, when it falls on a plate of any kind of matter, whose thickness is one of the terms of the series 1, 3, 5, 7, &c. taking the smallest thickness capable of reflecting such ray for unit; and, in the same way, it is in one of its fits of easy transmission.

when the thickness is one of the terms of the series 2, 4, 6, 8, &c. See OPTICS.

FIXED AIR. See CARBONIC acid gas.

FIXED stars. See STAR.

FLAG is more particularly used at sea; for the colours, ancients, standards, &c. borne on the tops of the masts of vessels, to notify the person who commands the ship, of what nation it is, and whether it be equipped for war or trade. The admiral in chief carries his flag on the main-top; the vice-admiral on the fore-top; and the rear-admiral on the mizzen-top. When a council of war is to be held at sea, if it be on board the admiral, they hang a flag in the main-shrouds; if in the vice-admiral, in fore-shrouds; and if in the rear-admiral, in the mizzen-shrouds. Besides the national flag, merchant-ships frequently bear lesser flags on the mizen-mast, with the arms of the city where the master ordinarily resides; and on the fore-mast, with the arms of the place where the person who freights them lives.

FLAG, to lower or strike the, is to pull it down upon the cap, or to take it in, out of the respect, or submission, due from all ships or fleets inferior to those any way justly their superiors. To lower or strike the flag in an engagement is a sign of yielding. The way of leading a ship in triumph is to tie the flags to the shrouds, or the gallery, in the hind part of the ship, and let them hang down towards the water, and to tow the vessels by the stern. Livy relates, that this was the way the Romans used those of Carthage.

FLAG, to hang out the white, is to ask quarter; or it shows when a vessel is arrived on a coast, that

it has no hostile intention, but comes to trade, or the like. The red flag is a sign of defiance, and battle.

FLAG officers, those who command the several squadrons of a fleet; such are the admirals, vice-admirals, and rear-admirals. The flag-officers in our pay, are the admiral, vice-admiral, and rear-admiral, of the white, red, and blue. See **ADMIRAL**.

FLAG ship, a ship commanded by a general or flag-officer, who has a right to carry a flag, in contradistinction to the secondary vessels under the command thereof.

FLAGELLANTES, *whippers*, in church-history, certain enthusiasts in the thirteenth century, who maintained, that there was no remission of sins without flagellation, or whipping. Accordingly, they walked in procession, preceded by priests carrying the cross, and publicly lashed themselves, till the blood dropped from their naked backs.

FLAGEOLET, a little flute, used chiefly by shepherds, and country-people. It is made of box, or other hard wood, and sometimes of ivory, and has six holes besides that at the bottom, the mouth-piece, and that behind the neck. See the article **FLUTE**.

FLAIL, an instrument for thrashing corn. A flail consists of the following parts: 1. the hand-staff, or piece held in the thresher's hand; 2. the swiple, or that part which strikes out the corn; 3. the caplins, or strong double leathers, made fast to the tops of the hand-staff and swiple; 4. the middle band, being the leather thong, or fish-skin, that ties the caplins together.

FLAMBEAU, a kind of large taper, made of hempen

wicks, by pouring melted wax on their top, and letting it run down to the bottom... This done, they lay them to dry; after which, they roll them on a table, and join four of them together by means of a red-hot iron; and then pour on more wax, till the flambeau is brought to the size required. Flambeaus are of different lengths, and made either of white or yellow wax.

FLAME. Simple ignition never exceeds in intensity of light the body by the contact of which it is produced; but flame consists of volatile inflammable matter, in the act of combustion, and combination, with the oxygen of the atmosphere. Many metallic substances are volatilized by heat, and burn with a flame, by contact of the air, in this pure state. Sulphur in the act of inflammation is volatilized, and in that state it unites with the oxygen of the air, and forms **SULPHURIC acid**, which see.

FLAMEN, in Roman antiquity, the name of an order of priests, instituted by Romulus or Numa; authors not being agreed on this head.

FLANEL, or **FLANNEL**, a loose sort of woollen stuff, not crossed, and wove on a loom with two treddles, like baize.

FLATS, in music, a kind of additional notes, which, together with sharps, serve to remedy the defects of musical instruments, wherein temperament is required.

FLAX, See **Linum**.

FLEA, *pulex*, in zoölogy, a genus of insects without wings, of a roundish, compressed figure: the legs are three pair, and formed for leaping: the eyes are two, and simple; the mouth is bent down-

ward; the colour is a deep purple, approaching to black. The flea is an insect which infests birds, as well as quadrupeds, and lays eggs, called nits: these produce a kind of nymphe, or white worms; which after some time are transformed, in the manner of caterpillars, into perfect fleas.

FLEECE, *Order of the golden*, an order of knight-hood instituted by Philip II. duke of Burgundy. These knights at first were twenty-four, besides the duke himself, who reserved the nomination of six more: but Charles V. increased them to fifty. He gave the guardianship of this order to his son, Philip, king of Spain, since which the Spanish monarchs are chiefs of the order. The knights had three different mantles ordained them at the grand solemnity, the collar and fleece.

FLEECY Hosiery, a useful kind of manufacture in which fine fleeces of wool are interwoven into a cotton piece of the common stocking texture. Any thing manufactured in this way, has, on one side, the appearance of common hosiery, and on the other that of raw wool.

FLEET, commonly implies a company of ships of war, belonging to any prince or state: but sometimes it denotes any number of trading ships, employed in a particular branch of commerce. In sailing, a fleet of men of war usually divide into three squadrons; the admiral's, the vice admiral's, and the rear admiral's squadron, all which being distinguished by their flags and pendants, are to put themselves, and, as near as may be, to keep themselves, in their customary places, viz. The admiral, with his squadron, to sail in the van, that so he may lead the way to all the rest in the day time, by the

right of his flag in the main-top mast head; and in the night-time, by his lights or lanterns. The vice-admiral and his squadron, are to sail in the centre or middle of the fleet; the rear-admiral and the ships of his squadron, to bring up the rear. Sometimes, other divisions are made, and those composed of the lighter ships, and the best sailors, are placed as wings to the van, centre, and rear.

Merchant-fleets generally take their denomination from the place they are bound to, as the "Turkey-fleet," "East India-fleet." These, in times of peace, go in fleets for their mutual aid and assistance: in time of war, besides this security, they likewise procure convoys of men of war, either to escort them to the places whither they are bound, or only a part of the way, to a certain place or latitude.

FLEET-DITCH, a small stream, which, rising in the adjacent country, passing through Clerkenwell, and running under a market to which it gives name, empties itself into the Thames, on the right of Blackfriars-bridge, in London. The name "fleet" is not commonly accounted for; but it appears to originate in the flowing of the tide of the Thames into its mouth, a circumstance more particularly observable near that river, where alone the stream is so called. *Flota*, from the Saxon *fleot*, signifies, in barbarous Latin, a place where the tide comes up.

FLEET-prison, a gaol to which persons are committed by the courts of chancery and common-pleas; or in which they are confined for debt. It has its name from a small stream, called Fleet-ditch, close to which it stands.

duction, which surrounds, nourishes, and fertilizes the seed or fruit in its earliest state.

FLOWERS, in chemistry, a term formerly applied to a variety of substances procured by sublimation, and were in the form of slightly colouring powder: hence, in all old books, we find mention made of the flowers of antimony, arsenic, zinc, and bismuth, which are the sublimed oxides of these metals, either pure, or combined with a small quantity of sulphur: we have also still in use, though not generally, the terms flowers of sulphur, benzoïn, &c.

FLUATES, in chemistry, salts of which the Fluoric acid (which see) is the chief ingredient. Fluor spar, denominated fluato of lime, which is found in great plenty in many countries, and is very abundant in Derbyshire, where it obtains the name of Derbyshire spar, is the most important among the fluates. The chief properties of these salts are, 1. When sulphuric acid is poured upon them, they emit acrid vapours of fluoric acid, which corrode glass. 2. When heated, several of them phosphoresce. 3. They are not decomposed by heat, nor altered by combustibles. 4. They combine with silica by means of heat.

FLUID, in physiology, an appellation given to all bodies whose particles easily yield to the least partial pressure, or force impressed.

The nature of a fluid, as distinguished from that of a solid, or hard body, consists in this, that its particles are so loosely connected together, that they readily move out of their places, when pressed with the least force one way more than another; whence philosophers have concluded, that these particles are exceedingly minute, smooth, and round,

it being otherwise impossible they should move with such freedom upon the least inequality of pressure.

Those particles, considered separately, are endowed with all the common properties of matter, and are subject to the same laws of motion and gravitation with larger bodies. To inquire, therefore, into the nature of fluids, is to consider what appearances a collection of very small round bodies, subject to these laws, will exhibit under different circumstances.

FLUIDS, motion of. The motion of fluids, viz. their descent or rise below or above the common surface or level of the source or fountain, is caused either, 1. By the natural gravity or pressure of the fluid contained in the reservoir, or fountain; or, 2. By the pressure or weight of the air on the surface of the fluid in the reservoir, when it is at the same time either taken off or diminished on some part in aqueducts, or pipes of conduit. 3. By the spring or elastic power of compressed or condensed air, as in the common water engine. 4. By the force of pistons, as in all kinds of forcing pumps, &c. 5. By the power of attraction, as in the case of tides, &c.

FLUOR spar, the native fluuate of lime, from whence is obtained

FLUORIC acid: the most remarkable property of this acid, is the facility with which it corrodes glass and all siliceous bodies, especially when hot, and the ease with which it holds silica in solution, even when in a state of gas. Hence this acid has been applied to etching on glass vessels.

FLUTE, an instrument of music, the simplest of

all those of the wind kind. It is played on by blowing it with the mouth, and the tones or notes are changed by stopping and opening the holes disposed for that purpose along its side. The antient fistulæ, or flutes, were made of reeds, afterwards of wood, and lastly of metal : but how they were blown, whether as our flutes, or as hautboys, does not appear.

It is plain some had holes, which, at first, were but few, but afterwards increased to a great number, and some had none ; some had single pipes, and some a combination of many, particularly Pan's syringa, which consisted of seven reeds joined together sidewiss.

FLUTE, German, an instrument entirely different from the common-flute. It is not, like that, put into the mouth to be played, but the end is stopped, with a tampion, or plug ; and the lower lip is applied to a hole about two inches and a half, or three inches, distant from the end. This instrument is usually about a foot and a half long ; rather bigger at the upper end than the lower ; and perforated with holes, besides that for the mouth, the lowest of which is stopped and opened by the little finger pressing on a brass, or sometimes a silver key, like those in hautboys, bassoons, &c. Its sound is exceedingly sweet and agreeable ; and serves as a treble in a concert.

FLUTES or flutings, in architecture, perpendicular channels, or cavities, cut along the shaft of a column, or pilaster. They are chiefly effected in the Ionic order, where they had their first rise ; though, indeed, they are used all in the richer orders, as the Corinthian and Composite ; but seldom in the Doric,

and scarcely ever, in the Tuscan. Each column has twenty-four flutes, and each flute is hollowed in exactly a quadrant of a circle; but the Doric has but twenty. Between the flutes are little spaces that separate them, which Vitruvius calls *stria*, and we *lists*: though, in the Doric, the flutes are frequently made to join to one another, without any intermediate space at all; the list being sharpened off to a thin edge, which forms a part of each flute.

FLUX, a general term, in chemistry, to denote any substance, or mixture, added to assist in the fusion of minerals. The fluxes made use of in experiments consist usually of alkalies, which render earthy mixtures fusible, by converting them into glass; or by converting glass itself into powder. See GLASS.

FLUXIONS, a method of calculation invented by sir Isaac Newton. In this branch of mathematics, magnitudes of every kind are supposed to be generated by motion. This science is employed in the investigation of curves, in finding the contents of solids, and computing their surfaces; in finding the centres of gravities and oscillation of different bodies; the attractions of bodies under different forms; the direction of wind which has the greatest effect on an engine; and in the solution of many other interesting and important problems.

FLYERS, in architecture, such stairs as go straight, and do not wind round; nor have the steps made tapering, but the fore and back part of each stair, and the ends, respectively parallel to one another; so that if one flight do not carry you to your intended height, there is a broad half space, whence

you begin to fly again, with steps every where of the same length and breadth, as before.

FLYING, the progressive motion of a bird, or other winged animal, in the liquid air. The parts of birds chiefly concerned in flying are the wings, by which they are sustained or wafted along. The tail, Willoughby; Ray; and many others, imagine to be principally employed in steering and turning the body in the air, as a rudder: but Borelli has put it beyond all doubt, that this is its least use, and that it is to assist the bird in its ascent and descent in the air; and to obviate the vacillations of the body and wings: for the turning to this or that side is performed by the wings, and inclinations of the body, and but very little by the help of the tail. The flying of a bird, in effect, is quite a different thing from the rowing of a vessel. Birds do not vibrate their wings towards the tail, as oars are struck towards the stern, but waft them downwards: nor does the tail of the bird cut the air at right angles, as the rudder does the water; but is disposed horizontally, and preserves the same situation what way soever the bird turns.

In a word, as a vessel is turned about on its centre of gravity to the right, by a brisk application of the oars to the left, so a bird in beating the air with its right wing alone, towards the tail, will turn its fore part to the left. Thus pigeons, changing their course to the left, would labour with their right wing, keeping the other almost at rest. Birds of a long neck alter their course by the inclinations of their head and neck, which altering the course of gravity, the bird will proceed in a new direction.

3. The manner of Flying is this: the bird first bends his legs, and springs with a violent leap from the ground; then opens and expands the joints of his wings, so as to make a right line perpendicular to the sides of his body: thus the wings, with all the feathers therein, constitute one continued lamina. Being now raised a little above the horizon, and vibrating the wings with great force and velocity perpendicularly against the subject air, that fluid resists those successions, both from its natural inactivity and elasticity, by means of which the whole body of the bird is protruded. The resistance the air makes to the withdrawing of the wings, and consequently the progress of the bird, will be so much the greater, as the waft or stroke of the fan of the wing is longer: but as the force of the wing is continually diminished by this resistance, when the two forces come to be in equilibrio, the bird will remain suspended in the same place: for the bird only ascends so long as the arch of air the wing describes, makes a resistance equal to the excess of the specific gravity of the bird above the air. If the air, therefore, be so rare as to give way with the same velocity as it is struck withal, there will be no resistance, and consequently the bird can never mount. Birds never fly upwards in a perpendicular line, but always in a parabola. In a direct ascent, the natural and artificial tendency would oppose and destroy each other, so that the progress would be very slow. In a direct descent they would aid one another, so that the fall would be too precipitate.

Flying, Artificial, that attempted by men, by the assistance of mechanics. The art of flying has

been attempted by several persons in all ages. The Leucadians, out of superstition, are reported to have had a custom of precipitating a man from a high cliff into the sea, first fixing feathers, variously expanded, round his body, in order to break his fall. Friar Bacon, who lived nearly five hundred years ago, not only affirms the art of flying possible, but assures us, that he himself knew how to make an engine wherein a man sitting might be able to convey himself through the air, like a bird; and farther adds, that there was then one who had tried it with success: but this method, which consisted of a couple of large, thin, hollow copper globes, exhausted of the air, and sustaining a person who sat thereon, Dr. Hook shows to be impracticable. The philosophers of Charles the Second's reign, were much busied about this art. The famous bishop Wilkins was so confident of success in it, that he says, he does not question but, in future ages, it will be as usual to hear a man call for his wings, when he is going a journey, as it is now to call for his boots.

FLYING-army, a small body under a lieutenant or major-general, sent to harrass the country, intercept convoys, prevent the enemy's incursions, cover its own garrisons, and keep the enemy in continual alarm.

FLYING-fish, a name given by English writers to several species of fish, which, by means of their long fins, have a method of keeping themselves out of the water a long time.

Focus, in geometry and conic sections, a point where the rays reflected from all parts of a curve concur and meet.

Fog, a meteor, consisting of grass vapours, floating near the surface of the earth.

Foil, among jewellers, a thin leaf of metal placed under a precious stone, in order to make it look transparent, and give it an agreeable different colour, either deep or pale: thus, if you want a stone to be of a pale colour, put a foil of that colour under it; or if you would have it deep, lay a dark one under it. These foils are made either of copper, gold, or gold and silver together; the copper foils are commonly known by the name of *Nuremberg* or *German foils*.

FOLIATING of looking-glasses, the spreading the plates over, after they are polished, with quick-silver, &c. in order to reflect the image. It is performed thus: a thin blotting paper is spread on the table, and sprinkled with fine chalk; and then a fine lamina or leaf of tin, called foil, is laid over the paper: upon this mercury is poured, which is to be distributed equally over the leaf with a hare's foot, or cotton: over this is laid a clean paper, and over that the glass-plate, which is pressed down with the right-hand, and the paper drawn gently out with the left: this being done, the plate is covered with a thicker paper, and laden with a greater weight, that the superfluous mercury may be driven out, and the tin adhere more closely to the glass. When it is dried, the weight is removed, and the looking-glass is complete.

FOLKMORE, was the common council of all the inhabitants of a city or town, or borough; or according to Spelman the folkmore was a sort of annual parliament or convention of the bishops, thesars, aldermen, and freemen on every May-day.

1. Fomentation, in medicine, the bathing any part of the body with a convenient liquor; which is usually a decoction of herbs, water, wine, or milk; and the applying of bags stuffed with herbs and other ingredients, which is commonly called dry fomentation.

2. FONT, among ecclesiastical writers, a large basin, in which water is kept for the baptizing of infants, or other persons. It is so called, probably, because baptism was usually performed among the primitive Christians at springs or fountains. In process of time the font came to be used, being placed at the lower end of the church, to intimate, perhaps, that baptism is the rite of admission into the Christian Church. By the canons of the Church of England, every church is to have a font made of stone; because, according to Durandus, the water which typified baptism in the wilderness flowed from a rock; or, rather, because Christ is in Scripture called the corner-stone, and the rock.

FONT, or FOUNT, in printing, see *Fount*.

FOOD, in its largest sense, direct and metaphorical, whatever is taken for nourishment; in reference to the animal economy, whatever solid or liquid aliment is received into the stomach; and, in a more confined sense, solid aliment only.

FOOL, according to Mr. Locke, is a person who makes false conclusions from right principles; whereas a madman, on the contrary, draws right conclusions from wrong principles.

FOOT, a part of the body of most animals whereon they stand. Animals are distinguished, with respect to the number of their feet, into bipeds, two-footed; such are men and birds; quadrupeds,

four-footed; such are most land-animals: and **multi-pedals**; or many-footed, as insects. The reptile-kind, as serpents, have no feet; the crab-kind of fish have ten feet; but most other fishes have no feet at all: the spider, mite, and polypus have eight; flies, and grass-hoppers, have six feet. Animals destined to swim, and water-fowl, have their toes webbed together, as the goose and duck, &c. The fore-feet of the mole, rabbit, &c. are formed for digging and scratching up the earth, in order to make way for their head.

Foot, in the Latin and Greek poetry, a metre or measure, composed of a certain number of long and short syllables. These feet are commonly reckoned twenty-eight in number, of which some are simple, as consisting of two or three syllables, and are therefore called disyllabic or trisyllabic feet; others are compound, consisting of four syllables, and are therefore called tetrasyllabic feet.

Foot is also a long measure, or measure of length, consisting of 12 inches.

Geometricians divide the foot into 10 digits, and the digit into 10 lines.

Foot square, is the same measure, both in breadth and length, containing 144 square or superficial inches.

Foot, cubic or solid, is the same measure in all the three dimensions, length, breadth, and depth or thickness, containing 1728 cubic inches.

FORAGE, in the military art, denotes hay, oats, barley, wheat, grass, clover, &c. brought into the camp by the troopers, for the sustenance of their horses. Dry forage is the hay, oats, &c. delivered out of the magazines, to an army in garrison, or

when they take the field, before the green forage is sufficiently grown up to supply the troops. It is the business of the quarter-master-general to appoint the method of forage, and post proper guards for the security of the foragers.

FORCE, in mechanics, denotes the cause of the change in the state of a body, when being at rest it begins to move.

FORE-CASTLE of a ship, that part where the fore-mast stands. It is divided from the rest by a bulk-head.

FOREMAST of a ship, a large round piece of timber, placed in her fore-part, or fore-castle, and carrying the foresail and fore top-sail yards. Its length is usually 8-9ths of the main-mast; and the fore-top gallant-mast is half the length of the fore-top-mast. See **MAST**.

Foremast-men are those on board a ship that take in the top-sails, sling the yards, furl the sails, bowse, trice, and take their turn at the helm.

FOREST, in law, is defined to be a certain territory of woody grounds, and fruitful pastures, privileged for wild beasts and fowls of forest, chase, and warren, to rest and abide under the protection of the king, for his princely delight, bounded with unremoveable marks, and meres, either known by matter of record or prescription; replenished with wild beasts of venery, or chase, with great coverts of vert for the said beasts; and for preservation and continuance whereof, with the vert and venison, there are certain particular laws, privileges, and officers.

Forests, in England, are of so great antiquity, that, excepting the New-forest in Hampshire,

erected by William the Conqueror, and Hampton-court, erected by Henry VIII. it is said, that there is no record or history which makes any certain mention of their erection, though they are mentioned by several writers, and in divers of our laws and statutes.

There are sixty-nine forests in England, thirteen chaces, and eight hundred parks. The four principal forests are New-forest, Sherwood-forest, Dean-forest, and Windsor forest.

A forest, strictly taken, cannot be in the hands of any but the king, for no other person but the king has power to grant a commission to be justice in eyre of the forest; yet, if he grants a forest to a subject, and that on request made in the chancery, that subject and his heirs shall have justices of the forest, in which case the subject has a forest in law.

FOREST towns, in geography, certain towns of Swabia, in Germany, lying along the Rhine, and the confines of Switzerland, and subject to the house of Austria. Their names are Rhinefield, Seckingen, Lauffenburg, and Waldshut.

FORE-STAFF, or CROSS-STAFF, an instrument used at sea for taking the altitude of the sun, moon, or stars. It is called fore-staff, because the observer, in using it, turns his face towards the object; whereas, in using Davis's quadrant, the back of the observer is towards the object; and hence its denomination of back-staff.

FORESTALLING, in law, buying or bargaining for any corn, cattle, victuals, or merchandize, in the way as they come to fairs or markets to be sold, be-

fore they get thither, with an intent to sell the same again at a higher price.

FORESTER, a sworn officer of the forest, appointed by the king's letters-patent, to walk the forest at all hours, to watch over the vert and venison; also to make attachments and true presentments of all trespasses committed within the forest.

FORFEITURE, properly signifies the effect of transgressing some penal law, and extends to lands or goods. Forfeiture differs from confiscation, in that the former is more general, while confiscation is particularly applied to such things as become forfeited to the king's exchequer; and goods confiscated, are said to be such as nobody claims.

FORFICULA, the earwig, a genus of insects of the order coleoptera, containing eighteen species, of which the *forficula auricularia* is very common in wet ground, ripe fruit, and old wood; and has been occasionally found to creep into the ears of such as sleep in the open air; when it is easily destroyed by dropping into the ear either a little oil or spirits, or both. The eggs are white and oval, and large for the size of the insect; they are found deposited in damp situations, and generally under stones. The parent is more provident of the young larvæ than insects generally are, brooding over them for several hours in the day, after the manner of birds.

FORGE, properly signifies a little furnace, wherein smiths and other artificers of iron or steel, &c. heat their metals red-hot, in order to soften and render them more malleable and manageable on the anvil.

FORGE is also used for a large furnace, wherein

It is here, taken out of the mine, is melted down, (as it is more properly applied to another kind of furnace, wherein the iron ore, melted down and separated in a former furnace, and then cast into sows and pigs, is heated and fused over again, and beaten afterwards with large hammers, and thus rendered more soft, pure, ductile, and fit for use. Of these there are two kinds: the first is called the finery, where the pigs are worked into gross iron, and prepared for the second, which is called the chafery, where it is farther wrought into bars fit for use.

FORGERY, an offence which, at common law, is punishable with fine, imprisonment, and pillory; and by statute, in the generality of cases, with death. A forgery, to be capital, consists in affixing the name of an individual, in a manner purporting to be his hand writing, to a paper, the contents of which tend to the injury of his estate.

FORGING, in smithery, the beating or hammering iron on the anvil, after having first made it red-hot in the forge, in order to extend it into various forms, and fashion it into works. There are two ways of forging and hammering iron; one is by the force of the hand, in which there are usually several persons employed, one of them turning the iron and hammering likewise, and the rest only hammering. The other way is by force of a water-mill, which raises and works several huge hammers beyond the force of man; under the strokes whereof the workmen present large lumps or pieces of iron, which are sustained at one end by the anvils, and at the other by iron chains fastened to the ceiling of the forge.

This last way of forging is only used in the

largest work, as anchors for ships, which usually weigh several thousand pounds. For the lighter work, a single man serves to hold heat, and turn with one hand, while he hammers with the other.

Every purpose the work is designed for, requires its proper heat ; for if it be too cold, it will not feel the weight of the hammer, as the smiths call it, when it will not batter under the hammer ; and if it be too hot, it will red-sear, that is, break, or crack, under the hammer.

The several degrees of heats the smiths give their irons are, first, a blood-red heat ; secondly, a white flame-heat ; and, thirdly, a sparkling or welding-heat.

FORLORN-HOPE, in the military art, signifies men detached from several regiments, or otherwise appointed, to make the first attack in the day of battle ; or, at a siege, to storm the counterscarpe, or mount the breach. They are so called from the great danger to which they are unavoidably exposed ; but the word is old, and begins to be obsolete.

FORM, Printer's an assemblage of letters, words, and lines, ranged in order, and so disposed into pages by the compositor ; from which, by means of ink and a press, the printed sheets are drawn. Every form is inclosed in an iron chase, wherein it is firmly locked by a number of pieces of wood, some long and narrow, and others of the form of wedges. There are two forms required for every sheet, one for each side ; and each form consists of more or fewer pages, according to the size of the book.

FORMIC ACID, in chemistry, the acid of ants.

which is extracted from them either by distillation or expression with water; in the living insect it reddens blue flowers, goes off in the form of a vapour, smelling like musk, and destroys animals. Under this gaseous form it is capable of serving economical purposes like vinegar; is decomposed by a great heat, takes oxygen from oxygenated muriatic acid; and forms salts with alkalies and acetas, which are crystallizable and not deliquescent.

Formica, the ant, a genus of insects of the order hymenoptera: females and neuters are armed with a concealed sting; males and females with wings; neuters wingless. This is a gregarious and industriously industrious family, consisting like bees of males, females, and a third kind, which are yet called neuters. These last are the well known little insects who construct the nest, or ant hills, who labour with such unremitting assiduity for the support of themselves and the idle males and females, and who guard with such ferocity the larvæ or what are commonly called ants eggs. They wander about all day in search of food or materials for the nest, and assist each other in bringing home what is too cumbersome for each as they attempt it. They every day bring out of their nest and expose to the warmth of the sun the newly hatched larvæ and feed them till they are able to provide for themselves. In the evening they consume together whatever has been collected during the day, and do not as is commonly supposed lay up store for the winter, but probably against that season become torpid and die.

Form, in the military sense a small fortified place,

environed on all sides with a moat, rampart, and parapet. Its use is to secure some high ground, or the passage of a river, to make good an advantageous post, to defend the lines and quarters of a siege, &c. Forts are made of different figures and extents, according as the ground requires. Some are fortified with bastions, others with demi-bastions. Some again are in form of a square, others of a pentagon. A fort differs from a citadel, as this last is built to command some town.

Fortification, the art of fortifying a town, or other place; or of putting it in such a posture of defence, that every one of its parts defends, and is defended, by some other parts, by means of ramparts, parapets, moats, and other bulwarks; to the end, that a small number of men within may be able to defend themselves for a considerable time against the assaults of a numerous army without; so that the enemy, in attacking them, must of necessity suffer great loss.

Fortification is either ancient or modern, regular or irregular. Ancient fortification, at first, consisted of walls or defences made of trunks, and other branches of trees, mixed with earth, to secure them against the attacks of the enemy. This was afterwards altered to stone-walls, on which were raised breast works, behind which they made use of their darts and arrows in security. Modern fortification, is that which is flanked and defended by bastions and out-works, the ramparts of which are so solid, that they cannot be beat down but by the continual fire of several batteries of cannon. Regular fortification is that built in a regular polygon, the sides and angles of which are all equal, being commonly

about a musket-shot from each other. Irregular fortification, on the contrary, is that where the sides and angles are not uniform, equidistant, or equal; which is owing to the irregularity of the ground, valleys, rivers, hills, and the like.

The principal maxims of fortification are these:

1. That every part of the works be seen and defended by other parts, so that the enemy can lodge nowhere without being exposed to the fire of the place.
2. A fortress should command all places round it; and therefore all the out-works ought to be lower than the body of the place.
3. The works farthest from the centre, ought always to be open to those more near.
4. No line of defence should exceed a point blank musket-shot, which is about an hundred and twenty or an hundred and twenty-five fathoms.
5. The more acute the angle at the centre is, the stronger will be the place.
6. In great places, dry trenches are preferable to those filled with water, because sallies, retreats, and succours are frequently necessary; but, in small fortresses, water-trenches, that cannot be drained, are best, as standing in need of no sallies. Different authors recommend different methods of fortification; but the principal are those of Pagan, Blondel, Vauban, and Scheiter.

FORTITUDE, a quality of the mind, sometimes but erroneously considered as the same with courage. Courage may be a virtue or a vice: fortitude is always a virtue: we speak of a desperate courage, but never of a desperate fortitude. A mere contempt of danger may be called courage, and this is found in some brutes as well as in the human race. In man it depends partly on habit,

partly on strength of nerves, and partly on want of consideration. But fortitude is the virtue of a rational and considerate mind, founded on a sense of honour, and a regard to duty. The motives to fortitude are many and powerful, and this virtue tends much to the happiness of the individual, by giving composure and presence of mind, and keeping the other passions in due subordination.

Forum, in Roman antiquity, a public standing place, within the city of Rome, where causes were judicially tried, and orations delivered to the people.

Fossil, in natural history, any thing dug out of the earth, whether that be its natural or its accidental situation; no body of the first kind being called native, and one of the second extraneous.

I. Native fossils are substances found either buried in the earth, or lying on its surface, of a plain simple structure and showing no signs of containing vessels, or circulating juices.

II. Extraneous fossils are bodies of the vegetable or animal kingdoms, accidentally buried in the earth.

1. Of the vegetable, the principal kinds are trees and herbaceous plants, or the parts of these.

2. Of the animal there are four kinds: 1. sea-shells; 2. the teeth, or bony points and bones of fishes; 3. complete fishes; 4. the bones of land animals.

Foundry, or **foundary**, the art of casting all sorts of metals into different forms. It likewise signifies the work-house, or smelting hut, wherein these operations are performed.

FOUNDRY, Letter, or casting of printing letters. The first thing requisite is to prepare good steel-punches, on the face of which is drawn the exact shape of the letter with pen and ink, if the letter be large; or with a smooth blunted point of a needle, if small; and then, with proper gravers, the cutter digs deep between the strokes, letting the marks stand on the punch; then files the outside, till it is fit for the matrice. They have a mould by which to justify or regulate the matrices, and which consists of an upper and under part, both which are alike, except the stool and spring behind, and a small roundish wire in the upper part for making the nick in the shank of the letter. These two parts are exactly fitted into each other to slide backward and forward. Then they justify the mould, by casting about twenty samples of letters, which are set in a composing-stick, with the nicks towards the right hand; and comparing these every way with the pattern-letters, set up in the same manner, they find the exact measure of the body to be cast. Next they prepare the matrice, which is of brass or copper, an inch and a half long, and of a proportionable thickness to the size of the letter it is to contain. In this metal is sunk the face of the letter by striking the letter punch the depth of an *n*. After this, the sides and face of the matrice are justified, and cleared, with files, of all buncings that have been made by sinking the punch. Then it is brought to the furnace, which is built upright of brick with square sides, and a stone at top, in which is a hole for the pan to stand in. They have several of these furnaces. The metal of which types are formed is lead, with a

mixture of the regulus of antimony, or such other substance as the letter founder approves. These being duly mixed and melted in a large crucible of cast-iron, by continued stirring with an iron ladle, the workmen proceed to draw the metal off into small troughs of cast-iron, which are ranged to the number of fourscore on a level platform faced with stone. In the course of a day, fifteen hundred-weight of metal can be prepared in this manner.

The founder must now be provided with a ladle differing from other iron ladles only in its size, which is adapted to that of the letter he is to cast. Before he begins this operation, he must kindle the fire in his furnace to melt the metal in the pan. If it be a small bodied letter, or a thin letter with great bodies, that he intends to cast, his metal must be very hot, and sometimes red hot, to make the letter come. Then taking a ladle that will hold as much as will make the letter and break, he lays it at the hole, where the flame bursts out, to heat; then he ties a thin leather cut with its narrow end against the face, to the leather groove of the matrice, by whipping a brown thread twice about the leather groove, and fastening the thread with a knot. Then he puts both pieces of the mould together, and the matrice into the matrice-cheek; and places the foot of the matrice on the stool of the mould, and the broad end of the leather on the wood of the upper half of the mould, but not tight up, lest it hinder the foot of the matrice from sinking close down upon the stool, in a train of work. Afterward, laying a little rosin on the upper part of the mould, and having his casting-ladle hot, he,

with the belling side, melts the resin and presses the broad end of the leather hard down on the wood, and so fastens it thereto. In the act of casting, placing the under half of the mould in his left hand with the hook or jag forward, he holds the ends of its wood between the lower part of the ball of his thumb and his three hinder fingers; then, he lays the upper half of the mould upon the under half; and, at the same time, the foot of the matrice places itself upon the stool, and clasping his left hand thumb strongly over the upper half, he simply catches hold of the bow, or spring, with his right hand fingers at the top of it, and his thumb under it, and places the point of it against the middle of the notch in the reverse side of the matrice, pressing it forward as well toward the mould as downward, by the shoulder of the notch, close upon the stool, while at the same time, with his hinder fingers, he draws the under half of the mould toward the ball of his thumb, and thrusts with the ball of his thumb, the upper part towards his fingers, that both the registers of the mould may press against both sides of the matrice, and his thumb and fingers press both sides of the mould close together. Then he takes the handle of his ladle in his right hand, and with the ball of it gives two or three strokes outwards upon the surface of the melted metal, to clear it of the scum; then he takes up the ladle full, and having the mould in the left-hand, turns his left side a little from the furnace, and brings the jet of his ladle to the mouth of the mould; and turns the upper part of his right hand towards him, to pour the metal into it, while at the same instant, he puts the mould

in his left hand forwards, to receive the metal with a strong shake, not only into the bodies of the mould, but, while the metal is yet hot, into the very face of the matrice, to receive its perfect form there as well as in the shank. Then he takes the upper half of the mould off, by placing his right thumb on the end of the wood next his left thumb and his two middle fingers at the other end of the wood: he tosses the letter, break and all, upon a sheet of waste paper, laid on a bench, a little beyond his left hand; and then is ready to cast another letter, as before, and likewise the whole number in that matrice.

Then, boys, commonly employed for this purpose, separate the breaks from the shanks, and rub them on a stone, and afterwards a man cuts them all of an even height, which finishes the fount for the use of the printer. A workman will ordinarily cast 3000 of these letters in a day. The perfection of letters thus cast, consists in their being severally square and straight on every side; all of the same height, and evenly lined, without stooping one way, or other; neither too big in the foot, nor the head; well grooved, so as the two extremes of the foot contain half the body of the letter; and well ground, barbed, and scraped, with a sensible notch.

FOUNT or **FONT**, among printers, a set or quantity of letters, and all the appendages belonging thereto, as numeral characters, quadrates, points, &c. cast by a letter-founder, and sorted.

Founts are large or small, according to the demand of the printer, who orders them by the hundred weight, or by sheets. When a printer orders a *fount of five hundred*, he means that the fount

should weigh 500 lb. When he demands a fount of ten sheets, it is understood, that with that fount he shall be able to compose ten sheets, or twenty forms, without being obliged to distribute. The foundry takes his measures accordingly; he reckons 120 lb. for a sheet, including the quadrates, &c. or 60 lb. for a form, which is only half a sheet: not that the sheet always weighs 120 lb. or the form 60 lb. on the contrary, it varies according to the size of the fount; besides, it is always supposed that there are letters left in the cases. As therefore every sheet does not comprehend the same number of letters, nor the same sort of letters, we must observe, that, as in every language some sounds recur more frequently than others, some letters will be in much more use, and oftener repeated than others, and consequently their cells or cases should be better stowed than those of the letters which do not recur so frequently: thus, a fount does not contain an equal number of *a* and *b*, or of *b* and *c*, &c. the letter-founders have therefore a list or tariff, or, as the French call it, a *police*, by which they regulate the proportions between the different sorts of characters that compose a fount; and it is evident that this tariff will vary in different languages, but will remain the same for all sorts of characters employed in the same language.

FOUNTAIN, or *artificial fountain*, in hydraulics, called also a *jet d'eau*, is a contrivance by which water is violently thrown upwards. See **HYDRAULICS**.

FOX, in zoology, an animal of the dog-kind, which much resembles the common dog in form, and is of the size of a spaniel: it is chiefly distin-

guished by its long and straight tail, with the tip white. The fox is a native of most northern countries. That of Siberia is about the size of the common kind; but its head is larger, and its tail not only larger and more bushy, but all of one colour.

Fraction, in arithmetic and algebra, is a part or parts of something considered as an unit or integer.

Fractions are distinguished into vulgar or common, and sexagesimal and decimal. Vulgar fractions consist of two parts or quantities, one written over the other, with a short line between them, as $\frac{2}{5}$ ths: this is called two fifths of any unit, as a foot, yard, pound, &c. The 2, or quantity above the line, is called the numerator: the 5, or quantity under the line, is the denominator; If the numerator of a fraction is equal to the denominator, then the fraction is equal to 1. If the numerator is greater than the denominator, then the fraction is greater than unity; and is called an improper fraction: but if the numerator is less than the denominator, then the fraction is proper, and is less than unit, $\frac{3}{5} < 1$. $\frac{3}{5}$ is a proper fraction; $\frac{7}{4}$ is an improper fraction, and is equal $1\frac{3}{4}$ because 7 divided by 4 gives 1 and 3 over.

Fractions are brought to a common denominator by multiplying each numerator by all the denominators except its own, and placing under each numerator the number which arises from multiplying all the denominators together, this is called a common denominator: thus:

$$\frac{1}{2} \dots \frac{2}{3} \dots \frac{1}{4} = \frac{1 \cdot 6}{1 \cdot 6} \dots \frac{2 \cdot 6}{1 \cdot 6} \dots \frac{3 \cdot 6}{1 \cdot 6}$$

now these expressions are equal to the former ones; that is $\frac{1}{2} = \frac{1 \cdot 6}{1 \cdot 6}$, and so of the rest!

To add fractions together, bring them to a common denominator: then add all the numerators to-

gether, and place under their sum the common denominator; in the example above the three fractions added together are $\frac{1}{2} + \frac{1}{3} + \frac{1}{6} = 1$.

To subtract fractions: bring them to a common denominator, and subtract them less from the greater: thus, as above, to subtract $\frac{1}{2}$ from $\frac{2}{3}$, we have, when brought to a common denominator,

$$\frac{2}{3} - \frac{1}{2} = \frac{4}{6} - \frac{3}{6} = \frac{1}{6}$$

Multiplication of fractions is performed by multiplying the numerators together for a new numerator, and the denominators for a new denominator: thus to multiply $\frac{2}{3}$ by $\frac{3}{4}$; we say $\frac{2}{3} \times \frac{3}{4} = \frac{6}{12}$ for the answer.

Fractions are divided by multiplying them crossways, thus to divide $\frac{2}{3}$ by $\frac{3}{4}$: we say,

$$\frac{2}{3} \div \frac{3}{4} = \frac{2}{3} \times \frac{4}{3} = \frac{8}{9}$$

FRANCE, a country in Europe, bounded on the North by the English Channel, and the Austrian Netherlands; on the East by Germany, and the Alps which separate it from Switzerland, Savoy, and Piedmont; on the South by the Mediterranean Sea and Spain, from which kingdom it seems naturally divided by the Pyrenees; and the West by the Atlantic. The kingly government of France continued from Clovis, in 486, to the death of Louis XVI. in 1793. It was then declared a republic; and with the fall of monarchy all titles of nobility were abolished, and the religion of the kingdom completely changed. The ancient division into provinces was also changed into that of departments, which were at first 83 in number; but by the addition of conquered countries, the number is now nearly 120. In the year 1804 Bonaparte was made emperor of France, and since that period he has

restored titles of dignity and honour with which to reward his generals and great men ; he has subjugated the greater part of the Continent, and placed his brothers and relatives upon thrones which the career of his success had rendered vacant.

FRANCHISE, in a general sense, privilege or exemption from ordinary jurisdiction ; as that for a corporation to hold pleas among themselves to a given amount.

FRANCISCANS, FRIARS-MINOR, OR GREY-FRIARS, religious of the order of St. Francis, by whom they were founded in the year 1209. See **FRIAR**.

The rule of the Franciscans, as established by St. Francis himself, is briefly this : they are to live in common, in celibacy, and to pay obedience to the Pope and their superiors. Before they can be admitted into the order, they are obliged to sell all they have, and give it to the poor ; they are to perform a year's noviciate, and when admitted never to quit the order upon any account. They are to fast from the feast of All-saints to the Nativity. The Franciscans had sixty-three monasteries in England, one of which was in the parish of St. Nicholas in London.

FRANKS, an appellation given by the Turks, and other nations of Asia, to all the people of the western parts of Europe, to which they give the name of Frankistan.

FRAXINUS, the *ash*, in botany, a genus of trees, belonging to the polygamia, diœcia class : the fruit is single, of a compressed lanceolate figure, and is what we commonly call the ash-key, several clusters of which are affixed to the same common pedicle. The wood of this tree is in great use among

several artificers, as wheel-wrights, cart-wrights, carpenters, and turners, for making ploughs, harrows, axle-trees, oars, and various other articles. It is said to be as lasting for building as oak, and often preferred before it: though the timber of the trunk greatly excels that of a bough. Some ash is also so curiously veined, that the cabinet-makers equal it to ebony, and call it green-ebony; so that the woodmen, who light upon such trees, may have for it what they will.

FREE, OR IMPERIAL CITIES, in Germany, are those not subject to any particular prince, but governed, like republics, by their own magistrates; as Hamburg, Bremen, Lubec, and Ratibon formerly were.

FREEHOLD, signifies lands or tenements which a person holds in fee-simple, fee-tail, or for term of life. Freehold is distinguished into freehold in deed, and freehold in law; the first of which signifies the real possession of lands, &c. in fee, or for life; the other is the right that a person has to such lands or tenements before his entry. Freehold is also extended to such offices as a man holds in fee, or during life.

FREE-STONE, a whitish stone dug up in many parts of England, that works like alabaster, but is more hard and durable. It is a kind of the grit-stone; but finer sanded, and a smoother stone, and is called *free*, from its being of such a constitution as to cut freely in any direction: such is the Portland-stone, and the free-stone of Kent.

FREEDOM of a corporation, the right of enjoying all the privileges and immunities belonging to it. The freedom of cities, and other corporations, is regularly obtained by serving an apprenticeship; but

it is also purchased with money, and sometimes conferred by way of compliment.

FREE-THINKER, a name usually applied to a *Deist*. Lately a sect of Christians have claimed the title of free-thinking Christians: we suspect they are very weak and shallow thinking Christians.

FREEZING, in physics, the same with congelation. When a body passes from a solid to a fluid state, the absorption of heat by that body (the which, as has been said, causes its fluidity), produces a degree of sensible surrounding cold. A very cheap and easy experiment will manifest this fact: take equal parts of salt-petre and sal-ammoniac, finely powdered, and upon three ounces of this mixture pour four ounces of spring water, and it will be found that the sudden dissolution of these salts will render the water so cold as to sink a thermometer plunged in it, thirty-six degrees. As therefore, even in summer, it is easy to procure spring or pump water at the temperature of fifty degrees, the addition of the salts will reduce that temperature to fourteen degrees; which is sufficient to freeze the water of a phial plunged into it, into one complete mass of ice. Another freezing mixture, which is still more powerful, may be made by adding to powdered ice, or to snow, a quantity of common salt. The salt is of a temperature above freezing; but the ice or snow, having a stronger attraction than the salt for the caloric it contains, will absorb the latter: the ice or snow, being thus rendered fluid, will dissolve the salt. From both these effects a great quantity of heat will be absorbed; and consequently the mixture will be much colder than either snow or the salt separately, and

will freeze very powerfully any fluid with which it is brought in contact. See COLD.

FREIGHT, in navigation and commerce, the hire of a ship, or a part thereof, for the conveyance and carriage of goods from one port or place to another ; or the sum agreed on between the owner and the merchant, for the hire and use of a vessel.

FRESCO, see PAINTING.

FRET, or **FRETTE**, in architecture, a kind of knot or ornament, consisting of two lists or small fillets variously interlaced or interwoven, and running at parallel distances equal to their breadth. Every return and intersection of these frets must be at right angles, otherwise they lose all their beauty, and become perfectly gothic. Sometimes the fret consists but of a single fillet, which, if well disposed, may be made to fill its space exceedingly well.

FRIAR, from the French *frere*, a brother, in a general sense, a term common to monks of all orders, founded on this, that there is a kind of fraternity, or brotherhood, between the several religious persons of the same convent or monastery.

Friar, in its more peculiar and proper sense, is restrained to such monks as are priests. "How many modern writers," says Horace Walpole, "confound monks and friars ! yet they were almost as different as laymen and priests. Monachism was an old institution for *laymen*. The friars, *freres*, or brothers, were instituted in the thirteenth century, in order, by their preaching, to oppose the Lollards. They united priesthood with monachism ; but while the monks were chiefly confined to their respective houses, the friars were wandering about

as preachers and confessors. This gave great offence to the secular clergy, who were thus deprived of profits and inheritances. Hence the satyrical and impure figures of friars and nuns in our old churches. Do you remember any example of retaliation? I suppose there were similar libels on the secular clergy in the chapels of friaries now abolished."

FRICTION, in mechanics, the rubbing of the parts of engines and machines against each other, by which means a great part of the effect is destroyed. The causes of friction are (1) The roughness of the contiguous surfaces: (2) The irregularity of the figure, which arises either from imperfect workmanship, or from the pressure of one body on another: (3) An adhesion, or attraction which is more or less powerful according to the nature of the bodies in question: and 4. The interposition of extraneous bodies, such as moisture, dust, &c. In all machines one fourth or even one third of the power must be considered as lost by friction, that is, if it gain by calculation 450lb. more than about, 800lb. gain, in practice, must not be depended on.

FRIDAY, the sixth day of the week, so called from Frea, or Friga, a goddess worshipped by the Saxons on this day.

FRIGATE, among seamen, a ship of war, light built, and a good sailer. A frigate has commonly two decks, whence that called a light frigate, is a frigate with only one deck.

F'LAGATOON, a Venetian vessel, commonly used in the Adriatic sea, with a square stern, and carrying only a main-mast, mizen, and bowsprit.

FUROR or **terror**, a sudden and violent degree of

fear. Sudden fear is frequently productive of very remarkable effects on the human system. In general, the effects of terror are a contraction of the small vessels, and a repulsion of the blood into the large ones, hence proceed general oppression, trembling, and irregularity in the motions of the heart, while the lungs are overcharged with blood.

FRINGILLA, in ornithology, a comprehensive genus of birds, of the order of the passerres, with the beak of a conic sharp-pointed figure, the two chaps of which mutually receive each other. To this genus belong the gold-finch, the chaff-finch, green-finch, yellow-hammer, canary-bird, linnet, sparrow, &c. The canary-bird was originally brought from the Canary-islands; first known in Europe about the end of the fifteenth century; and not bred in that part of the world till about the middle of the seventeenth. Their naturalization appears to have originated in accident. A vessel which was carrying, among other commodities, a number of these birds to Leghorn, was wrecked on the coast of Italy; and being thus set at liberty, they flew to the nearest land, which was the island of Elba, where they found the climate so favourable that they multiplied, and would probably have become domesticated had they not been caught in snares. It seems that the breed, thus introduced, has long been lost. At Ymst, there is a company which, after the breeding-season is over, send out persons to different parts of Germany and Switzerland to purchase birds from those who breed them, each agent commonly returns with three or four hundred birds, which are afterwards carried for sale not only through every part of Germany;

but also to England; Russia, and even Constantinople. About sixteen hundred are sent yearly to England, where the dealers, notwithstanding the expenses they have incurred, and after having carried them on their backs, perhaps a hundred miles, sell them at a few shillings a-piece.

FATR, in the manufacture of glass, is the principal material in the business. A saline substance drawn from the ashes of the plant kali, or from other plants, mixed with sand or flint, and baked together, makes an opaque substance called frit.

FRIZZ, in commerce, a kind of woollen cloth or stuff, frized or knapped on one side.

FRIZING of cloth, a term, in the woollen manufactory, applied to the forming of the nap of a cloth, or stuff, into a number of little hard burrs or prominences, covering almost the whole ground thereof.

FROG. See RANA.

FROST, in physics, that state of the natural world in which the atmosphere so absorbs the caloric from bodies on the surface of the globe, as to leave them, more or less, without fluidity or expansion.

It appears that water and other fluids are capable of containing caloric in two very different states. In the one, they seem to imbibe it in such a manner that it eludes all the methods by which it is customary to observe it, either by our sensation of feeling, or by the thermometer; in the other, it manifests itself obviously to the senses, either by the touch, the thermometer, or the emission of light.

In the first of these states, the body is called cold; but here we are not to suppose a total ab-

sence of heat or caloric : for even those fluids that are coldest contain it in a very considerable proportion. Thus vapour, which is colder to the touch than the water from which it was raised, has in its composition an immense quantity of caloric, even more than sufficient to heat it red hot. The same may be said of common salt, and of snow or ice. If a quantity of each of these substances be separately reduced to the degree of 28 or 30 of Fahrenheit's thermometer, upon mixing them together, the heat which would have raised the thermometer to that degree, now enters into their substance in such a manner that the mercury falls down to 0, —Here an excessive degree of cold is produced ; and yet the substances contain the very same quantity of heat that they did before the mixture ; for they absorb it from all bodies around them ; and if water in a small vessel be placed in them, they will so draw out its caloric as to reduce it to a mass of ice.

It seems, therefore, that the senses, even when assisted by thermometers, can only judge of the state in which the caloric is with relation to surrounding bodies, without regard to its quantity. Thus, if the caloric flows from any part of our bodies into any substance actually in contact with it, the sensation of cold is excited, and we call that substance *cold* ; but if it flows from any substance into our bodies, the sensation of heat is excited, and we call that substance *hot* ; without regard to the absolute quantity in either case.

FRUIT, in general, includes whatever the earth produces for the nourishment and support of man, and other animals ; as herbs, grain, hay, and corn.

Fruit also implies an assemblage of seeds in a head, as in a ranunculus ; and all kinds of seeds, or grains, whether inclosed in a cover, capsule, or pod ; and whether bony, fleshy, skinny, or membranous.

The structure and parts of different fruit differ in some things, but in all the species the essential parts of the fruit appear to be only continuations or expansions of those which are seen in the other parts of the tree ; and the same fibres are continued to them from the root. An apple, cut in two transversely, will be found principally composed of four parts : 1. A skin, or rind, which is only a continuation and expansion of the outer bark of the tree. 2. A parenchyma, or pulp, which is an expansion and intumescence of the blea, or inner bark of the tree. 3. The fibres, or ramifications of the woody part of the tree. 4. The core, which is the produce of the pith of the wood, indurated, or strengthened by twigs of the woody fibres intermixed with it. This serves to furnish a proper lodging for the seeds, and filtrates the juices of the parenchyma, or pulp, and conveys them to the seeds.

In plums, cherries, &c. there are four parts, viz. a coat, parenchyma, ramification, and stone. The outer part, or shell of the stone, seems formed of the calculous part of the nutritious juice of the plant ; and the inner part, or kernel, of the pith of the tree, derived thither by seminal branches, which penetrate the base of the stone. The acorn consists of a shell, cortex, and medulla : the shell consists of a coat and parenchyma, derived from the bark and wood of the tree. The cortex consists

of an inner and outer part, the first of which is a duplicate of the inner trunk of the shell; the second is a softer substance, derived from the same source as the parenchyma of the shell: but authors are not agreed whether the medulla, or pulp of the kernel, arises from the pith of the tree, or from the cortical part.

Berries, grapes, &c. contain, besides three general parts, viz. coat, parenchyma, and ramification. grains of a stony nature, which are the seeds. Fruits, in the economy of nature, are useful in guarding, preserving, and feeding the inclosed seed.

FRUSTUM, in mathematics, a part of some solid body separated from the rest: the frustum of a cone is the part which remains when the top is cut off by a plane parallel to the base.

FUGUE, in music, is when different parts of a musical composition follow each other; each repeating what the first had performed. There are three kinds of fugues; the simple, double and counter.

FULGORA, the lantern fly, is one of the hemiptera order of insects. It is very elegant, as well as a very extraordinary insect. Its length from the tip of the front to that of the tail, is nearly three inches and a half; and from wings end to wings end when expanded, nearly five inches and a half. The head is nearly as long as the whole of the rest of the animal, and is the immediate seat of that light for which this insect is so remarkable. This beautiful insect is a native of Surinam, and other parts of South America, and during the night it diffuses so strong a phosphoric splendour from its head,

that it may be employed for the purpose of a candle or torch. See pl. Nat. Hist. Fig. 20.

FULLER, a workman employed in the woollen manufactories, to mill, or scour cloths, serges, and other stuffs, in order to render them more thick, compact, and durable.

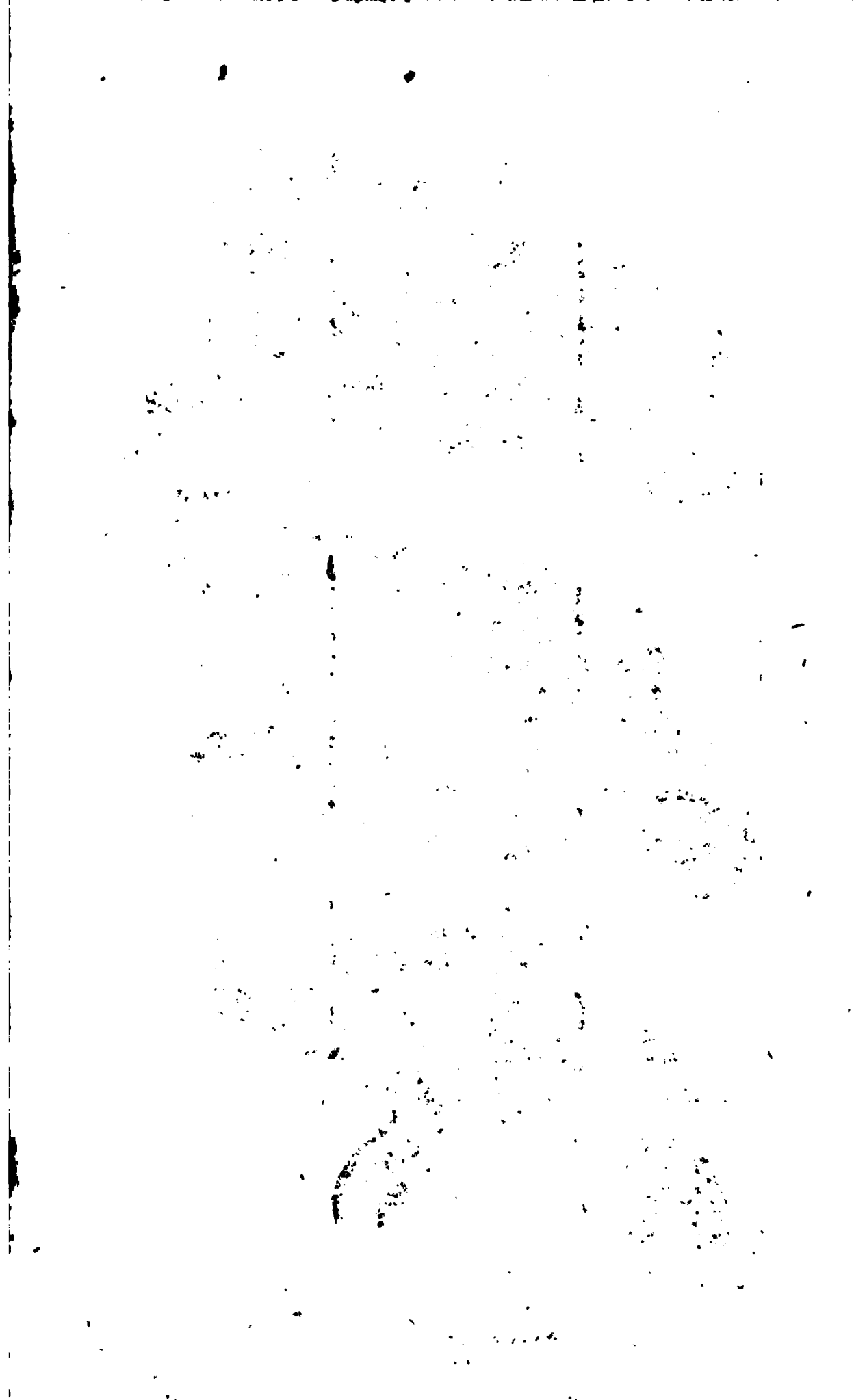
FULLER'S-earth, in natural history, a soft, greyish, brown, dense, and heavy marle: when dry it is of a greyish, ash-coloured brown, in all degrees from very pale to almost black, and it has generally something of a greenish cast: it is very hard and firm, of a compact texture, of a rough and somewhat dusty surface, that adheres slightly to the tongue: it is very soft to the touch, not staining the hands, nor breaking easily between the fingers.

FULLING, the art or act of scouring and pressing cloths, and other woollen manufactures, to cleanse, thicken, and render them more firm and strong, which is done by means of a water-mill.

FULMINATION. In chemistry, explosion or detonation, accompanied with a very considerable degree of sound. All these equally imply rapid decomposition with or without flame, and the intensity of sound alone distinguishes the idea of *fulmination* from those of *detonation* and *explosion*.

FULMINATING Powder; a powder that explodes upon the application of certain degrees of heat with instantaneous combustion, and prodigious sound. These are sometimes made with metals, and sometimes without.

FUNDS, a term adopted by those who speak of the public revenue of nations, to signify the several



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taxes that have been laid upon merchandizes either by way of duties of custom, or excise, or in any other manner, to supply the exigencies of the state, and to pay interest for what sums it may have occasion to borrow. Thus it is said, "such a duty, or such a tax, is a good fund to answer such a purpose."

The funds or taxes of the united kingdoms, are either temporary or perpetual: temporary ones, are such as are either imposed for a certain number of years, or annually, as the land and malt-taxes: the perpetual funds, are those on which money has been borrowed for the public service, and which are appropriated for the secure and certain payment of the interest of such money, till the discharge of the principal so borrowed. See **STOCKS**.

FUNGUS, in botany, an order of vegetables, extremely different from all others, and belonging to the *cryptogamia* class of Linnæus. The fungi have, indeed, so little of the common and general appearance of vegetables, that many have denied them to be such, and contended for their being only excrementous matter, protruded from decaying vegetables of other kind: but, notwithstanding the fungi have neither the colour nor texture of other plants, nor leaves nor flowers like them, yet they must be allowed to belong to the vegetable kingdom, as having absolute and perfect seeds, consisting usually of single antheræ, which produce plants like those from which they are collected.

The fungi are extremely different in figure, and in their manner and place of growth; some growing on the ground, some on living trees, and many

on decayed wood ; and this, horizontally, or erect. Some are of only a few days duration, others remain for years, and some there are which grow under the surface of the earth in no particular direction.

FURNISHER, a person who polishes, or cleans arms ; as guns, swords, pistols : an operation which is chiefly performed with emery.

FURLONG, a long measure, equal to 1-8th of a mile, or forty poles. It is also used in some law-books, for the eighth part of an acre.

FURLOUGH, in military language, a licence granted by an officer to a soldier, to be absent for some time from his duty.

FURNACE, See **LABORATORY**.

FUSION, a chemical process, by which bodies are made to pass from the solid to the fluid state in consequence of the application of heat. The chief objects susceptible of this operation are salts, sulphur and metals. Salts are liable to two kinds of fusion, the one, which is peculiar to saline matters, is owing to water, and is called aqueous fusion ; the other, which arises from the application of fire, is known by the name of igneous fusion.

FUSTICK, is the wood of the *Morus Tinctoria*, a tree that grows to a considerable size in the West Indies. It is much used in dyeing yellow, and produces a large quantity of colouring matter.

G.

G, the seventh letter in the English alphabet, but in the Greek, and all the oriental languages, it occupies the third place. It is a mute, and cannot be sounded without the assistance of a vowel. It has a hard and a soft sound, as in *game*, and *gesture*; as a numeral it formerly stood for 400, and with a dash over it, \bar{G} , 400,000. In music it is the character of the treble cleff, and from its being placed at the head, the whole scale took the name Gamut.

GABRES, or *gaws*, a name given by the Mohammedans to all who do not profess their religion, in the same sense that Christians use the word *infidel*, or *heathen*, and the Jews *gentes*, or *gentiles*. In Persia and in India, the name has a more precise signification, being applied to a religious sect who are said to be the remains of the ancient followers of Zoroaster. They are commonly immersed in the lowest condition of society; and are represented as extremely superstitious, but inoffensive, honest in their dealings, and in every respect rigorous in their morals. They expect a future life and judgment; worship one God; and have even preserved a pure idea of the symbol of fire: for though zealously attached to their religious rites, among which are the sign of adoration to the rising sun, and the custom of performing all their devotions before fire, they declare that they venerate these only as expressive images of the Deity himself.

GADUS, the cod-fish, in natural history. There are 23 species of this genus, the most important is the *Gadus morhua*, or common cod, which inhabits the northern seas of Europe and America, in innumerable shoals, and constitutes an important article of human subsistence. It is of all sizes, and has been known to weigh 60 or 70 lbs. It lives on small fish, particularly on crabs and others of the testaceous kind. It is a very voracious fish; and is so prolific that a million of eggs have been counted in a single roe. Its flesh is a high delicacy, particularly the sound or air-bladder, which is often used in the salted state. Off the coast of Cape Breton, Nova Scotia, and New England, and particularly on the great sand-bank off Newfoundland, this fish is found in inexhaustible abundance.

GALAXY, *milky-way*, in astronomy, that long white, luminous track, which seems to encompass the whole heaven, like a girdle. This, like every other phenomenon of nature, has supplied the poet with many a fantastic, and many a beautiful dream. The invention of the telescope has confirmed the conjecture of science; that it consists in a multitude of little stars, so remote as to be comprehended by the naked eye.

GALENIC, in medicine, that manner of proceeding in medicine which is founded upon the principles of Galen; or which that physician introduced.

GALENICAL medicines, those that are formed by the easier preparations of vegetables; as by infusion, or decoction, or by combining and multiplying ingredients; while the *chemical*, to which they are opposed, are those produced by extracting the more

intimate and remote virtues of the substances, through the means of fire and elaborate preparations; as calcination and digestion.

GALL, is a general word for acrid substances, and thus is used by St. Matthew for that mixture given to Jesus while on the cross, which St. Mark calls wine mingled with myrrh. It was a custom among the Greeks, Romans, and Jews, to give such bitter mixtures to those condemned to painful deaths, in order to benumb their senses.

GALL, in natural history, a protuberance or tumour produced by the puncture of insects, on plants and trees of various kinds, and of which a general idea will be formed from the account of the **Oak-GALL**.

GALL-BLADDER: is situated in the concave side of the liver, its use is to collect the bile, first secreted in the liver, and mixing it with its own peculiar produce to perfect it farther, to retain it together a certain time, and then expel it.

GALLEON, see **REGISTER-SHIP**.

GALLEY, a kind of low, flat-built vessel, furnished with one deck, and with sails and oars, and particularly useful in the Mediterranean.

GALLON, a measure of capacity both for dry and liquid things, containing four quarts; but these quarts, and consequently the gallon itself, are different, according to the quality of the thing measured: the wine gallon contains 231 cubical inches, and holds eight pounds avoirdupois of pure water: the beer and ale gallons contain 282 solid inches, and hold 10½ lbs. nearly; and the gallon for corn is equal to 272½ cubic inches, and holds about nine pounds 18 ounces of pure water.

GAMBIR, a tree of Malacca.

GAMBIR, a concrete vegetable juice, which forms an article of commerce at Cambaja, in the East-Indies, and which produces a most beautiful yellow colour. It has been employed to give colour to marble. As a medicine, it is a violent cathartic and emetic.

Game, or wild quadrupeds and birds, which are taken by fowling or hunting.

GAME-LAWS, those laws by which the right of killing game is confined to persons who have received grants of a chase, a park, or a free-warren. The natural law in this behalf would be that every man should take such game as he may find on the ground he occupies.

The two best arguments by which a municipal law to the contrary can be defended, are probably these: 1. As a precaution of policy, it has the effect of disarming the body of the people. To this it is easily answered, it might be prohibited to take game by means of arms. 2. As a question of property, it may be said that, like the right of tithes, it is a reserved right, known to be claimed, and with which incumbrance the ground is let, bargains concluded, and rent estimated. It may be argued, that the virtual contract is, that the tenant of the grounds shall possess the crops he can rear upon them, but have no pretension to the game upon them, which is a gift of nature; and all this would be very fair, if the game were not actually fed out of the crops in question: a fact from which it follows, that those who are privileged to kill game, enjoy that privilege, generally speaking, at the charge of those who are not.

An higher consideration, however, even than this, would surely present itself to the mind of an enlightened lawgiver. It is the business of laws to prevent crimes, not to create them ; but these laws create crimes, and are therefore at variance with the very principles of legislation.

GAMUT, or GAM-UT, in music, a scale whereby a learner is taught to sound the notes, *ut, re, mi, fa, sol, la*, in their several orders and dispositions.

Gam-ut is the first note in the scale.

GANTLET, *to throw the*, a proverbial phrase, signifying to challenge or defy. The expression derives its origin from the days of chivalry, when he that challenged an opponent in the lists threw down his glove, and he that accepted the challenge took it up.

The word *gantelet* is French, and comes from *gund* or *gant*, a glove. The gantlet was made of iron, and the fingers were covered with small plates. The gantelet itself was not in use before the thirteenth century.

GANTLOPE, *to run the*, a proverbial phrase, commonly expressed *to run the gantlet*, and signifying, primarily, a certain military punishment, and, figuratively, the passing through difficulties. According to the erroneous pronunciation, the hearer who compares this phrase with that which is the subject of the preceding article, is much at a loss what to understand by the word *gantlet*. The real words are these: "To run the Ghent-race." *Ghent*, is a well-known town in Flanders; and *loop*, in the Belgic, signifies a *race*. The gantlope, or Ghent-race, so called because invented at that

place, is this : in the land-service, when a soldier is to be punished in this manner, the regiment is drawn out in two ranks, facing each other, and each soldier having a switch in his hand, lashes the criminal as he runs along naked from the waist upward : in the navy, the whole ship's crew is disposed in two rows, standing face to face on both sides of the deck, so as to form a line whereby the delinquent may go forward on one side, and return aft on the other, and each seaman, being furnished with a small-twisted cord, strikes him as he passes.

Glass delivery. See ASSIZE.

GIAKER, in natural history, a very beautiful gem, of a red colour, with an admixture of blue, and found in Bohemia. When free from blemishes, it is little inferior in colour to the oriental ruby, though only of a middle degree of hardness between the sapphire and the common crystal. It is found of various sizes, from that of a pin's head, to an inch in diameter.

GARTER, *order of the*, a military order of knight-hood, said to have been first instituted by Richard the First, at the siege of St. John of Acre, where he caused twenty-six knights, who firmly stood by him, to wear thongs of blue leather about their legs. It is also understood to have been perfected by Edward the Third, and to have received some alterations, which were afterwards laid aside, from Edward the Sixth ; but the number of knights remained as at first established, till the year 1786, when it was increased to thirty-two.

This order is never conferred but upon persons of the highest rank. The motto, *Honi soit qui mal y*

pena, is by some interpreted, "Shame to him that thinks evil himself," and said to allude to the enterprise of Edward for obtaining the kingdom of France; while others translate it "Evil to him that evil thinks," and tell us, that with these words Edward, at a ball, presented to the countess of Salisbury her garter, which had happened to fall. In the spirit of the times, it is added, this incident laid the foundation of the order. If mere conjecture may be ventured on the subject, it is possible that the order was already in being, and that the king, with a happy presence of mind, quoted its motto. When the knights do not wear their robes, they are to have a silver star on their left side; and they frequently wear a piece of jewelry, representing St. George, dependent on a blue ribbon, crossing the body from the left shoulder. They are not to appear abroad without the garter, which is the most important part of their habiliments, on penalty of 6s. 8d. to be paid to the register of the order. Their college is within the chapel of St. George, in the castle of Windsor.

Gas, a general term employed in chemistry to express all those aerial fluids, whether produced by chemical experiments, or evolved in natural processes, which are not condensable by the cold of our atmosphere, and which differ from the air of the atmosphere. The term gas does not include those aerial substances which arise from water, ether, &c. on the application of heat, because they are readily condensed into their respective fluids again, by a certain reduction of temperature, whereas the gases retain their elasticity in every variation of

the temperature and pressure of the atmosphere. See CARBONIC acid, HYDROGEN, OXYGEN, &c.

GASTRIC juice, a fluid of great importance in the process of digestion: it does not act indiscriminately on all substances, nor is it the same in all animals, nor does it continue always of the same nature, even in the same animal: it acts with a chemical energy in dissolving food, changes, completely, all its sensible properties, and gives it new and very different ones. This fluid does not act as a ferment, and it is a powerful antiseptic.

GAVEL-KIND, a tenure or custom belonging to lands in Kent, some of the principal properties of which are these: 1. The tenant is of age to alienate his estate at 15 years. 2. The estate does not escheat in case of an attainder and execution for felony, the maxim being,

“ The father to the bough,

“ The son to the plough ;” or,

“ The father to the bonde,

“ The son to the londe ;”

3. In most places, he had the power of devising lands by will, before the statute for that purpose was made. 4. The lands descend not to the eldest, the youngest (as is the case with those of a manor in Essex), or to any one son only, but to all. These privileges were among those for which the Kentish men made a stand against the conqueror. Gavel-kind is, by some, said to signify the sort of tenure which belonged to gavel-land; and *gavel land*, as the *folc-land*, which payed tribute, was devisable by will, and might descend to all the children. Before the conquest, this is supposed to have been the state of the lands of England in general; and,

imply the principles of the feudal system will not count for all the customs which gavel-kind is opposed. It was this that gave the king a title to forfeited lands; it was to maintain fighting men that lands were kept together by the law of primogeniture; it was still more essential to this end that such lands should not be divisible by will; and it was in consideration of military service that they were free from taxes.

GAUNTLET. See **GANTLET**.

GAUNTLOPE. See **GANTLOPE**.

GAUN. See **GAINS**.

Gavens, or stereometry, a branch of geometry. See **MEASUREMENT**.

Gauze, or **Gauze** (from the French *gaze*), in commerce, a very thin, slight, transparent kind of stuff, woven sometimes of silk, and sometimes only of thread. The gauze-room is like a common one, but with some appendages. There are figured gauzes, and some with flowers of gold and silver, which last are chiefly brought from China.

Gazette, a newspaper; or printed account of the transactions of all the countries in the known world, in a loose sheet or half-sheet. In Britain, the name is confined to the paper of news published by authority. The word is French, from *gazette*, a Venetian coin, of about a farthing in value, which was the usual price of the first newspaper printed in that state. The first gazette published in England, was issued Nov. 7, 1665, at Oxford, where the court then was; and on the king's return to the metropolis, the series of *London Gazette* commenced.

GELUM, one of the constituent parts of animal

substances. Glue is gelatin in a state of impurity. When pure, it has neither taste nor smell. It forms a copious white precipitate with tan, which is brittle and insoluble in water, and is not changed by exposure to the air. It is a principal part both of the solid and fluid parts of animals.

Gem, in the natural history of fossils, a common name for all precious stones, of which there are two classes, the pellucid, and semi-pellucid.

1. The pellucid gems are compound bodies, extremely hard, and of great lustre.

2. The semi-pellucid gems are composed of chrystalline matter, slightly debased with earth.

The knowledge of gems depends on observing their hardness and colour. Their hardness is commonly allowed to stand in the following order: the diamond the hardest of all; then the ruby, sapphire, jacinth, emerald, amethyst, garnet, carnelian, chalcedony, onyx, jasper, agate, porphyry, and marble. This difference, however, frequently varies.

In point of colour, the diamond is valued for its transparency, the ruby for its purple, the sapphire for its blue, the emerald for its green, the jacinth for its orange, the amethyst-carnelian for its carnation, the onyx for its tawny, the jasper, agate, and porphyry, for their vermilion, green, and variegated tints.

All these gems are sometimes found coloured and spotted, and sometimes limped and colourless; in which case, they are known from each other by degree of hardness.

The semi-pellucid gems are frequently mentioned, on account of the figures, portraits, and

emblems engraved on them, in both ancient and modern times.

GENDARMES, or *GENS D'ARMES*; in the history of France, the denomination given to a select body of horse, on account of their succeeding the ancient gendarmes, who were completely clothed in armour. These troops were commanded by captain-lieutenants, the king and the princes of the blood being their captains.

GENERA, in grammar, a division of nouns or names, according as they belong to one of the two sexes, or to neither. It has happened, however, that a variety of words have been classed as masculine or feminine, for no reason whatever. The English language has very few terminations by which the genders are distinguished, such as *count* and *countess*, but generally supplies distinct words, as *boy*, *girl*; whereas, in the Latin and French, the terminations always mark the distinction, as *bonus equus*, a good horse; *bona equa*, a good mare; *un bon citoyen*, a good citizen; *une bonne citoyenne*, a good female citizen.

GENERAL, in military economy, one who commands in chief.

GENERAL, Adjutant, one who attends the general, assists in council, and carries the general's orders to the army.

GENERAL, Lieutenant, the next in rank after the general, and often employed to command in chief.

GENERAL, Major, the next officer to the lieutenant-general.

GENERALE, a particular beat of the drum, which gives notice for the infantry to be in readiness to march.

